GEOTECHNICAL REPORT

I-515 NORTHBOUND SOUNDWALLS
LAS VEGAS, NEVADA

JULY 2008

NEVADA DOT
GEOTECHNICAL ENGINEERING

MATERIALS DIVISION

STATE OF NEVADA

DEPARTMENT OF TRANSPORTATION

MATERIALS DIVISION

GEOTECHNICAL SECTION

GEOTECHNICAL REPORT
I-515 NORTHBOUND SOUNDWALLS BETWEEN NELLIS BOULEVARD AND MOUNTAIN VISTA STREET, LAS VEGAS

July 2008

CLARK COUNTY, NEVADA

Prepared by: _____

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TABLE OF CONTENTS

Appendices:

Background, Purpose, and Scope

The purpose of this project is to relieve noise and enhance the quality of life for those who live along the I-515 corridor. Nevada Department of Transportation (NDOT) has determined that sound barriers are needed along the east edge of I-515's northbound lanes from south of Nellis Boulevard to north of Mountain Vista Street in Clark County. The project limits extend approximately 1.0 miles between station "L" 629+67.42 P.O.T. and station "L" 678+67.42 P.O.T. where existing soundwall begins. Two twelve foot tall combination traffic barrier/soundwall will be structurally attached to the existing Duck Creek structure (B-1455) and Mountain Vista Street structure (H-1454) bridge rails. Four post and panel style soundwalls are proposed along the rest of the project length. These soundwalls will stand 12 feet above existing concrete pavement and extend into the roadway embankment fill slopes. The centerline of the post and panel soundwalls will be located 3 feet, measured horizontally, away from the outside edge of the existing Type A Concrete Barrier Rails.

The purpose of this report is to present the results of our investigation and to provide recommendations and other pertinent information regarding the design and construction of the proposed foundations to support the post and panel soundwalls. The scope of our work included surface reconnaissance, subsurface exploration, soil sampling, field/laboratory testing, and engineering analyses.

Exploration & Testing Program

Between March 3rd and March 7th, 2008 the Geotechnical Engineering Section drilled ten borings below the existing concrete pavement, to depths ranging from 19 feet to 26.5 feet, to investigate the subsurface ground conditions at the project site. Borings SWA 1 through SWA 10 were drilled along the post and panel soundwall alignments. Drilling was accomplished using a Diedrich D-120 drill rig equipped with 6-inch hollow stem auger flights. Representative soil samples were obtained using SPT (Standard Penetration Testing) and CMS (California Modified Sampler) equipment and procedures. All soil samples were classified using the Unified Soil Classification System (USCS) in accordance with ASTM D 2487. Boring locations and ground surface elevations were determined using original roadway elevation and alignment information contained in construction plan sheets from NDOT Contract 2154 and converted to current project stationing using a station equation provided by NDOT's Southern Nevada Engineering Services Division. Copies of the boring logs, a boring location map, and a key to boring symbols are provided in Appendix A.

Soil samples were transported to NDOT's Materials Division in Carson City for laboratory testing. Atterberg Limits tests, natural moisture content measurements, particle size analyses, unit weight measurements, and direct shear tests were completed to assist in sample identification, classification, and evaluation. Final results from all these tests are presented in the Summary of Results, Particle Size Distribution Reports and Direct Shear Test Report sheets included in Appendix B.

Site Conditions

The first section of post and panel wall will be constructed along the east edge of northbound I-515 between station "L" 629+67.42 and the Nellis Boulevard structure, approximately station "L" 633+50. One boring (SWA 1) was completed along the alignment of the first section. 11.5 inches of P.C.C.P. were encountered. The roadway embankment fill height varies between 2 feet and 16 feet along this section. The majority of the embankment fill is classified as dry medium dense to dense clayey sand with gravel. Beneath the embankment fill the native soil is classified as very hard to hard, dry to moist sandy clay.

The second section of post and panel wall will be constructed along the east edge of northbound I-515 between Nellis Boulevard structure and Duck Creek structure from about station "L" 635+00 to "L" 644+10. Two borings (SWA 2, SWA 3) were drilled along the alignment of the second section. The borings encountered 12 inches and 11 inches of P.C.C.P. respectively. The roadway embankment fill height varies between 0 and 14 feet along this section. The embankment fill varies from loose to dense clay, silt, sand and gravel mixtures. The native soil beneath the fill is classified as medium stiff, dry to moist, lean clay with sand and very dense clayey sand with gravel.

The third section of post and panel wall will be constructed along the east edge of northbound I-515 between Duck Creek Structure and Mountain Vista Street structure from approximately station "L" 646+60 to "L" 664+50. Four borings (SWA 4 through SWA 7) were drilled along the alignment of the third section. All borings encountered 11.5 inches to 14 inches of P.C.C.P. The roadway embankment fill height varies between 15 feet and 30 feet along this section. The majority of the embankment fill is classified as dense to very dense, dry, silty and/or clayey sand with gravel. The native soil beneath the embankment fill is logged in borings SWA 4 and SWA 5 and is classified as stiff to very stiff, dry to moist, sandy lean clay.

The fourth section of post and panel wall will be constructed along the east edge of northbound I-515 between Mountain Vista Street structure and existing soundwall from about station "L" 667+00 to "L" 678+67+50. Three borings (SWA 8, SWA 9, SWA 10) were drilled along the alignment of the fourth section. All borings encountered 11.5 inches to 12 inches of P.C.C.P. The roadway embankment fill height varies between 12 feet and 25 feet along this section. The embankment fill is generally classified as dense, dry, clayey and/or silty sand with gravel. The native soil beneath the embankment fill was logged in Boring SWA 10. The native soil is classified as very stiff, moist to wet, sandy lean clay. Free water was encountered at a depth of 25 feet.

Discussion and Recommendations

We recommend using 3-foot diameter drilled shafts with a length of 14 feet for the foundation of each post. Drilled shaft lengths were determined using the design loading conditions and analytical methods recommended by AASHTO (American Association of State Highway and Transportation Officials, References No. 1). Design loading conditions were provided to us by NDOT's Southern Nevada Engineering Services Division and are as follows. The design dead load on each drilled shaft is 27 kip. The design wind force generates a moment of 51.2 kip-ft and a shear force of 6.4 kip at the top of each drilled shaft. Design seismic forces cause a moment of 24.2 kip-ft and a shear force of 3.0 kip at the top of each drilled shaft. Drilled shaft length was determined using the design moment and shear force created by the wind, as this is the greatest load combination. The lateral deflection of the drilled shafts was analyzed using computer software LPILE. Estimated deflections are within the allowable limits.

Parts of I-515's roadway surface drainage system (ditched inlets, reinforced concrete pipes, manholes, etc.) are in close proximity to the proposed soundwall alignments. We recommend that drilled shafts be located at least 3 feet away (measured edge to edge) from these items to avoid construction conflicts.

Drilled shafts will need to be strategically located in order to avoid conflicting with two water lines of unknown depths. One 96-inch diameter waterline crosses the soundwall alignment between stations "L" 640+00 and "L" 642+00. The other waterline, with unknown diameter, crosses the soundwall alignment between stations "L" 669+00 and "L" 671+00. These are not the only utilities that exist within the project limits. The plans should be reviewed for additional details of utility locations.

Construction Considerations

The contractor should be aware that NDOT specifications allow rocks up to 3 feet in diameter to be placed within embankment fills. Therefore, the contractor should consider the effect that these cobbles and boulders might have on drilling operations. Such effects may include, but not be limited to, longer drilling times, more difficult drilling conditions, oversized shaft diameters, increase in concrete quantities, etc. Specialized equipment or drilling techniques may also be required.

The groundwater table was measured at an approximate elevation of 1783 feet in boring SWA 10, drilled at approximately station "L" 677+57. Drilled shaft bottom elevations from station "L" 675+57 to the end of the project at station "L" 678+67.42 are estimated to be less than 10 feet above the recorded groundwater table elevation. If the groundwater table is higher during construction, shafts drilled in this area may require wet construction methods in accordance with Section 509 of NDOT's "Standard Specifications for Road and Bridge Construction 2001".

REFERENCES

1) AASHTO, "Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals," 4th Edition, 2001. Washington D.C., 2001.

2) AASHTO, "Guide Specifications for Structural Design of Sound Barriers, 1989" Washington D.C., 1989. Includes Interims published in 1992, 2002.

3) AASHTO, "Standard Specifications for Highway Bridges," 17th Edition, 2002. Washington D.C., 1996. Includes Interims published in 1997 through 2002.

APPENDIX A

Key to Boring Logs
Boring Logs
Boring Location Map

KEY TO BORING LOGS

PARTICLE SIZE LIMITS									
CLAY	SILT	SAND			GRAVEL		COBBLES	BOULDERS	
		FINE	MEDIUM	COARSE	FINE	COARSE			
.002 mm		#200	#40	#10	#4	¾ inch	3 inch	12 inch	

USCS GROUP	TYPICAL SOIL DESCRIPTION
GW	Well graded gravels, gravel-sand mixtures, little or no fines
GP	Poorly graded gravels, gravel-sand mixtures, little or no fines
GC	Clayey gravels, poorly graded gravel-sand-clay mixtures
SW	Well graded sands, gravelly sands, little or no fines
SP	Poorly graded sands, gravelly sands, little or no fines
SM	Silty sands, poorly graded sand-silt mixtures
SC	Clayey sands, poorly graded sand-clay mixtures
ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands with slight plasticity
CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays
OL	Organic silts and organic silt-clays of low plasticity
MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts
CH	Inorganic clays of high plasticity, fat clays
OH	Organic clays of medium to high plasticity
CS	Claystone/Siltstone
PT	Peat and other highly organic soils

MOISTURE CONDITION CRITERIA

Description	Criteria
Dry	Absence of moisture, dusty, dry to touch.
Moist	Damp, no visible free water.
Wet	Visible free water, usually below groundwater table.

▽ ▼ Groundwater Elevation Symbols

SOIL CEMENTATION CRITERIA

Description	Criteria
Weak	Crumbles or breaks with handling or little finger pressure.
Moderate	Crumbles or breaks with considerable finger pressure.
Strong	Won't break or crumble w/finger pressure

STANDARD PENETRATION CLASSIFICATION*

GRANULAR SOIL		CLAYEY SOIL	
BLOWS/FT	DENSITY	BLOWS/FT	CONSISTENCY
0 - 4	VERY LOOSE	0 - 1	VERY SOFT
5 – 10	LOOSE	2 - 4	SOFT
11 - 30	MEDIUM DENSE	5 - 8	MEDIUM STIFF
31 - 50	DENSE	9 - 15	STIFF
OVER 50	VERY DENSE	16 - 30	VERY STIFF
		31 - 60	HARD
		OVER 60	VERY HARD

*Standard Penetration Test (N) 140 lb hammer 30 inch free fall on 2 inch O.D. x 1.4 inch I.D. sampler.

Blow counts on Calif. Modified Sampler (N_{CMS}) can be converted to N_{SPT} by:

$(N_{CMS})(0.62) = N_{SPT}$

Blow counts from Automatic or Safety Hammer can be converted to Standard SPT N_{60} by:

$(N_{AUTOMATIC})(1.25) = N_{60}$

$(N_{SAFETY})(1.17) = N_{60}$

TEST ABBREVIATIONS

CD	CONSOLIDATED DRAINED	O	ORGANIC CONTENT
CH	CHEMICAL (CORROSIVENESS)	OC	CONSOLIDATION
CM	COMPACTION	PI	PLASTICITY INDEX
CU	CONSOLIDATED UNDRAINED	RQD	ROCK QUALITY DESIGNATION
D	DISPERSIVE SOILS	RV	R-VALUE
DS	DIRECT SHEAR	S	SIEVE ANALYSIS
E	EXPANSIVE SOIL	SL	SHRINKAGE LIMIT
G	SPECIFIC GRAVITY	U	UNCONFINED COMPRESSION
H	HYDROMETER	UU	UNCONSOLIDATED UNDRAINED
HC	HYDRO-COLLAPSE	UW	UNIT WEIGHT
K	PERMEABILITY	W	MOISTURE CONTENT

SOIL COLOR DESIGNATIONS ARE FROM THE MUNSELL SOIL COLOR CHART.

EXAMPLE: (7.5 YR 5/3) BROWN

SAMPLER NOTATION

CMS	CALIF. MODIFIED SAMPLER①
CPT	CONE PENETRATION TEST
CS	CONTINUOUS SAMPLER②
CSS	CALIFORNIA SPLIT SPOON
P	PUSHED (NOT DRIVEN)
PB	PITCHER BARREL
RC	ROCK CORE③
SH	SHELBY TUBE④
SPT	STANDARD PENETRATION TEST
TP	TEST PIT

①- I.D.= 2.421 inch

②- I.D.=3.228 inch with tube; 3.50 inch w/o tube

③- NXB I.D.= 1.875 inch

④- I.D.= 2.875 inch

LAST MODIFIED: October 11, 2004

EXPLORATION LOG

NEVADA DEPARTMENT OF TRANSPORTATION — GEOTECHNICAL ENGINEERING

START DATE 3/3/08
END DATE 3/3/08
JOB DESCRIPTION I-515 Soundwalls
LOCATION Nellis Blvd to Mountain Vista St
BORING SWA-01
E.A. #
GROUND ELEV. (ft)
HAMMER DROP SYSTEM Automatic

GROUNDWATER LEVEL		
DATE	DEPTH ft	ELEV. ft

STATION 632+17
OFFSET 52' RT
ENGINEER Ablahani
EQUIPMENT Diedrich D-120
OPERATOR White
DRILLING METHOD 6" H.S.A.
BACKFILLED Yes DATE 3/3/08

ELEV. (ft)	DEPTH (ft)	SAMPLE NO.	SAMPLE TYPE	BLOW COUNT 6 inch Increments	BLOW COUNT Last 1 foot	Percent Recov'd	LAB TESTS	USCS Group	MATERIAL DESCRIPTION	REMARKS
									P.C.C.P.	P.C.C.P. @ 11.5" Thick
	1.00									
									Clayey Sand with Gravel dry, dense to medium dense.	
	3.00									
		A	SPT	10 19 12	31	80	PI, S, W	SC		Bulk Sample 1, 3'-5'.
	4.50									
	5.00									
5		B	SPT	7 7 11	18	95	PI, S, W			
	6.50									
	7.00									
								GC	**Clayey Gravel with Sand** medium dense.	
		C	CMS	5 10 16	26	100	PI, S, W			
	8.20							SM	**Silty Sand with Gravel** dense.	
	9.00									
	10.00	D	SPT	10 35	35	80	PI, S, W	CL	**Lean Clay with Sand** hard.	
10	10.00									
		E	SPT	41 43 40/.4'	40/.4'	100	PI, S, W	SC	**Clayey Sand** very dense.	
	11.40									
	12.50									
	13.40	F	SPT	25 50/.4'	50/.4'	100	PI, S, W			
15										
	16.00									
									Sandy Lean Clay very hard to hard, dry to moist.	
	17.50									
		G	SPT	36 50 50	100	115	PI, S, W			
	19.00									
20								CL		
	22.50									
		H	SPT	10 21 24	45	100	PI, S, W			
	24.00									
	24.00								**B.O.H.**	
25										

EXPLORATION LOG

NEVADA DEPARTMENT OF TRANSPORTATION — GEOTECHNICAL ENGINEERING

START DATE 3/4/08
END DATE 3/4/08
JOB DESCRIPTION I-515 Soundwalls
LOCATION Nellis Blvd to Mountain Vista St
BORING SWA-02
E.A. #
GROUND ELEV. (ft)
HAMMER DROP SYSTEM Automatic

GROUNDWATER LEVEL		
DATE	DEPTH ft	ELEV. ft

STATION 637+21
OFFSET 52' RT
ENGINEER Ablahani
EQUIPMENT Diedrich D-120
OPERATOR White
DRILLING METHOD 6" H.S.A.
BACKFILLED Yes DATE 3/4/08

ELEV. (ft)	DEPTH (ft)	SAMPLE NO.	SAMPLE TYPE	BLOW COUNT 6 inch Increments	BLOW COUNT Last 1 foot	Percent Recov'd	LAB TESTS	USCS Group	MATERIAL DESCRIPTION	REMARKS
									P.C.C.P.	P.C.C.P. @ 12" Thick
	1.00									
								CL	**Sandy Lean Clay with Gravel** loose, light brown.	
	3.00									
	4.50	A	SPT	4 3 5	8	75	PI, S, W			Bulk Sample 1, 3'-5'.
	5.00									
5										
	6.50	B	SPT	2 4 17	21	95	PI, S, W			
	6.00									
								GC	**Clayey Gravel with Sand** medium dense, white to pale brown.	
	7.00								7.00	
								CL	**Gravelly Lean Clay** medium dense.	
		C	CMS	3 8 34	42	100	PI, S, W, UW		7.70	
	8.50							GC	**Clayey Gravel with Sand** dense.	
									8.50	
	9.50	D	SPT	25 54	54	120	PI, S, W		**Clayey Sand with Gravel** very dense.	
	10.00									
10	10.50	E	SPT	50/.46'	50/.46'	100	PI, S, W			
								SC		
	14.00									
		F	SPT	6 20 32	52	100	PI, S, W			
15	15.50									
									17.00	
									Lean Clay with Sand hard, dry to moist.	
	19.00									
		G	SPT	9 14 17	31	130	PI, S, W			
20	20.50									
								CL		
	24.00									
		H	SPT	9 13 27	40	115	PI, S, W			
25	25.50								25.50	
									B.O.H.	

EXPLORATION LOG

NEVADA DEPARTMENT OF TRANSPORTATION — GEOTECHNICAL ENGINEERING

START DATE 3/4/08
END DATE 3/4/08
JOB DESCRIPTION I-515 Soundwalls
LOCATION Nellis Blvd to Mountain Vista St
BORING SWA-03
E.A. #
GROUND ELEV. (ft)
HAMMER DROP SYSTEM Automatic

GROUNDWATER LEVEL		
DATE	DEPTH ft	ELEV. ft

STATION 642+26
OFFSET 52' RT
ENGINEER Ablahani
EQUIPMENT Diedrich D-120
OPERATOR White
DRILLING METHOD 6" H.S.A.
BACKFILLED Yes DATE 3/4/08

ELEV. (ft)	DEPTH (ft)	SAMPLE NO.	SAMPLE TYPE	BLOW COUNT 6 inch Increments	BLOW COUNT Last 1 foot	Percent Recov'd	LAB TESTS	USCS Group	MATERIAL DESCRIPTION	REMARKS
									0.90 **P.C.C.P.**	P.C.C.P. @ 11" Thick
	2.50							SM	**Silty Sand with Gravel** dense, dry to moist, light brown.	
	4.00	A	SPT	7 13 18	31	95	PI, S, W			Bulk Sample 1, 3'-5'.
	5.00								4.50	
5	6.50	B	SPT	6 9 11	20	105	PI, S, W	SC SM	**Silty Clayey Sand** medium dense, dry to moist, light brown. 6.20	
	8.00							CL	**Sandy Lean Clay** very stiff.	
	9.50	C	CMS	5 8 11	19	100	PI, S, W, UW		9.50	
10	11.00	D	SPT	3 6 12	18	95	PI, S, W	SC SM	**Clayey Sand** medium dense.	
	12.50								12.00	
	14.00	E	CMS	5 4 3	7	100	PI, S, W, UW, DS	CL	**Sandy Lean Clay** medium stiff, tan.	
15	15.50	F	SPT	2 2 8	10	100	PI, S, W			
	17.50									
	19.00	G	CMS	14 18 18	36	100	PI, S, W		18.70	
	20.00	H	SPT	38 43	43	110	PI, S, W	SC SM	**Silty, Clayey Sand with Gravel** dense.	
20									22.50	
	25.00							CL	**Lean Clay** very stiff, plastic.	
25	26.50	I	SPT	4 7 13	20	120	PI, S, W		26.50	
									B.O.H.	

NV_DOT I-515 SOUNDWALLS.GPJ NV_DOT.GDT 8/26/08

EXPLORATION LOG

NEVADA DEPARTMENT OF TRANSPORTATION — GEOTECHNICAL ENGINEERING

START DATE 3/5/08
END DATE 3/5/08
JOB DESCRIPTION I-515 Soundwalls
LOCATION Nellis Blvd to Mountain Vista St
BORING SWA-04
E.A. #
GROUND ELEV. 1783.55 (ft)
HAMMER DROP SYSTEM Automatic

GROUNDWATER LEVEL		
DATE	DEPTH ft	ELEV. ft

STATION 647+30
OFFSET 52' RT
ENGINEER Ablahani
EQUIPMENT Diedrich D-120
OPERATOR White
DRILLING METHOD 6" H.S.A.
BACKFILLED Yes DATE 3/5/08

ELEV. (ft)	DEPTH (ft)	SAMPLE NO.	SAMPLE TYPE	BLOW COUNT 6 inch Increments	BLOW COUNT Last 1 foot	Percent Recov'd	LAB TESTS	USCS Group	MATERIAL DESCRIPTION	REMARKS
									P.C.C.P.	P.C.C.P. @ 14" Thick
	1.20									
									Silty, Clayey Sand with Gravel very dense, dry.	
	2.50									
	4.00	A	SPT	17 24 28	52	100	PI, S, W			Bulk Sample 1, 3'-5'.
1778.6	5									
	5.50	B	SPT	13 23 30	53	100	PI, S, W	SC SM		
	7.50									
	9.00	C	SPT	17 22 32	54	100	PI, S, W			
	9.50									
1773.6	10								**Clayey Sand with Gravel** very dense to dense, dry.	
	11.50	D	SPT	17 27 30	57	105	PI, S, W			
	12.00									
	13.50	E	SPT	13 25 23	48	105	PI, S, W	SC		
	15.00									
1768.6	15								**Sandy Lean Clay** stiff, dry to moist.	
	17.00									
	18.50	F	SPT	6 6 8	14	95	PI, S, W			
1763.6	20							CL		
	22.00									
	23.50	G	SPT	5 6 7	13	95	PI, S, W			(G) Foreign substance, possibly organic.
	23.50								**B.O.H.**	
1758.6	25									

EXPLORATION LOG

NEVADA DEPARTMENT OF TRANSPORTATION — GEOTECHNICAL ENGINEERING

START DATE 3/5/08
END DATE 3/5/08
JOB DESCRIPTION I-515 Soundwalls
LOCATION Nellis Blvd to Mountain Vista St
BORING SWA-05
E.A. #
GROUND ELEV. 1792.53 (ft)
HAMMER DROP SYSTEM Automatic

GROUNDWATER LEVEL		
DATE	DEPTH ft	ELEV. ft

STATION 652+35
OFFSET 52' RT
ENGINEER Ablahani
EQUIPMENT Diedrich D-120
OPERATOR White
DRILLING METHOD 6" H.S.A.
BACKFILLED Yes DATE 3/5/08

ELEV. (ft)	DEPTH (ft)	SAMPLE NO.	SAMPLE TYPE	BLOW COUNT 6 inch Increments	BLOW COUNT Last 1 foot	Percent Recov'd	LAB TESTS	USCS Group	MATERIAL DESCRIPTION	REMARKS
									P.C.C.P.	P.C.C.P. @ 12" Thick
	1.00									
									Silty Sand with Gravel very dense to dense.	
	2.50									Bulk Sample 1, 2'-5'.
		A	SPT	18 42 50/.46'	50/.46'	100	PI, S, W			
	4.00							SM		
1787.5	5.00									
	5									
		B	SPT	11 16 18	34	100	PI, S, W			
	6.50									
	7.50									
	7.00								**Sandy Lean Clay** stiff to very stiff.	
		C	SPT	4 7 7	14	85	PI, S, W			
	9.00									
1782.5	10.00									
	10									
		D	SPT	5 6 10	16	100	PI, S, W			
	11.50							CL		
	12.50									
		E	SPT	6 12 21	33	65	PI, S, W			
	14.00									
1777.5	15									
	16.00									
									Sandy Silt loose to medium dense.	
	17.50									
		F	SPT	4 5 8	13	100	PI, S, W	ML		
	19.00									
1772.5	20									
	21.00									
									Lean Clay with Sand very stiff.	
	22.50									
		G	SPT	3 6 10	16	105	PI, S, W	CL		
	24.00									
	24.00								**B.O.H.**	
1767.5	25									

EXPLORATION LOG

NEVADA DEPARTMENT OF TRANSPORTATION
GEOTECHNICAL ENGINEERING

START DATE 3/5/08
END DATE 3/5/08
JOB DESCRIPTION I-515 Soundwalls
LOCATION Nellis Blvd to Mountain Vista St
BORING SWA-06
E.A. #
GROUND ELEV. 1806.95 (ft)
HAMMER DROP SYSTEM Automatic

GROUNDWATER LEVEL		
DATE	DEPTH ft	ELEV. ft

STATION 657+39
OFFSET 52' RT
ENGINEER Ablahani
EQUIPMENT Diedrich D-120
OPERATOR White
DRILLING METHOD 6" H.S.A.
BACKFILLED Yes DATE 3/5/08

ELEV. (ft)	DEPTH (ft)	SAMPLE NO.	SAMPLE TYPE	BLOW COUNT 6 inch Increments	BLOW COUNT Last 1 foot	Percent Recov'd	LAB TESTS	USCS Group	MATERIAL DESCRIPTION	REMARKS
									P.C.C.P.	P.C.C.P. @ 12" Thick
	1.00							SC SM	**Silty, Clayey Sand with Gravel** dense to very dense, dry.	
	2.50–2.90	A	SPT	24/.4'	24/.4'	100	PI, S, W			(A) 10 blows with no progress. Bulk Sample 1, 2.5'-5'.
1802.0	5									
	5.00–6.50	B	SPT	14 24 36	60	95	PI, S, W			
	7.50–9.00	C	SPT	18 22 27	49	105	PI, S, W			
1797.0	10									
	10.00–11.50	D	SPT	16 17 25	42	100	S, W			
	12.50–14.00	E	SPT	13 21 27	48	75	PI, S, W			(E) Pulverized Rock in sample.
1792.0	15									
	17.50–19.00	F	SPT	12 30 30	60	95	PI, S, W			
1787.0	20									300 psi down 21'-21.7'. Hard Drilling 21'-23'.
	23.00							SC	**Clayey Sand with Gravel** dense, brown.	
1782.0	25									
	25.00–26.50	G	SPT	9 16 22	38	85	PI, S, W			
	26.50								**B.O.H.**	

EXPLORATION LOG

NEVADA DEPARTMENT OF TRANSPORTATION
GEOTECHNICAL ENGINEERING

START DATE 3/6/08
END DATE 3/6/08
JOB DESCRIPTION I-515 Soundwalls
LOCATION Nellis Blvd to Mountain Vista St
BORING SWA-07
E.A. #
GROUND ELEV. 1816.58 (ft)
HAMMER DROP SYSTEM Automatic

GROUNDWATER LEVEL		
DATE	DEPTH ft	ELEV. ft

STATION 662+44
OFFSET 52' RT
ENGINEER Ablahani
EQUIPMENT Diedrich D-120
OPERATOR White
DRILLING METHOD 6" H.S.A.
BACKFILLED Yes DATE 3/6/08

ELEV. (ft)	DEPTH (ft)	SAMPLE NO.	SAMPLE TYPE	BLOW COUNT 6 inch Increments	BLOW COUNT Last 1 foot	Percent Recov'd	LAB TESTS	USCS Group	MATERIAL DESCRIPTION	REMARKS
									P.C.C.P.	P.C.C.P. @11.5" Thick
	1.00								**Clayey Sand with Gravel** dense to very dense, dry.	
	2.50									Bulk Sample 1, 2'-5'.
	3.70	A	SPT	13 41 30/.2	30/.2	90	PI, S, W			(A) No progress.
1811.6	5 / 5.00									
	6.50	B	SPT	20 25 17	42	95	PI, S, W			(B) Pulverized rock in sample.
	7.50									
	9.00	C	SPT	12 17 24	41	100	PI, S, W			
1806.6	10 / 10.00							SC		
	11.50	D	SPT	8 9 11	20	85	PI, S, W			
	12.50									
	14.00	E	SPT	17 22 31	53	100	PI, S, W			
1801.6	15 / 15.00									
	16.50	F	SPT	8 15 20	35	95	PI, S, W			
	19.00								**B.O.H.**	Hard dilling began at 18.5'. No progress, terminate drilling at 19'.
1796.6	20									

EXPLORATION LOG

NEVADA DEPARTMENT OF TRANSPORTATION — GEOTECHNICAL ENGINEERING

START DATE 3/6/08
END DATE 3/6/08
JOB DESCRIPTION I-515 Soundwalls
LOCATION Nellis Blvd to Mountain Vista St
BORING SWA-08
E.A. #
GROUND ELEV. 1820.10 (ft)
HAMMER DROP SYSTEM Automatic

GROUNDWATER LEVEL		
DATE	DEPTH ft	ELEV. ft

STATION 667+48
OFFSET 52' RT
ENGINEER Ablahani
EQUIPMENT Diedrich D-120
OPERATOR White
DRILLING METHOD 6" H.S.A.
BACKFILLED Yes DATE 3/6/08

ELEV. (ft)	DEPTH (ft)	SAMPLE NO.	SAMPLE TYPE	BLOW COUNT 6 inch Increments	BLOW COUNT Last 1 foot	Percent Recov'd	LAB TESTS	USCS Group	MATERIAL DESCRIPTION	REMARKS
									P.C.C.P.	P.C.C.P. @ 12" Thick
	1.00									
									Silty Sand with Gravel dense, dry.	
	2.50									Bulk Sample 1, 2'-5'.
		A	SPT	11 15 20	35	80	PI, S, W			(A) Rock in sampler shoe.
	4.00									
	5.00									
1815.1	5									
		B	SPT	16 23 20	43	95	PI, S, W	SM		
	6.50									
	7.50									
		C	SPT	8 14 29	43	80	PI, S, W			
	9.00									
									9.50	
	10.00								**Clayey Sand with Gravel** dense, dry.	
1810.1	10									
		D	SPT	10 16 16	32	95	PI, S, W	SC		
	11.50									
									12.00	
	12.50								**Silty Sand with Gravel** dense to very dense, dry.	
		E	SPT	10 11 37	48	100	PI, S, W			(E) Pulverized rock in sample.
	14.00									
	15.00									
1805.1	15									
		F	SPT	11 14 17	31	95	PI, S, W			
	16.50									
								SM		Hard Drilling 17'-17.5'.
	20.00									
1800.1	20									
		G	SPT	16 28 33	61	100	PI, S, W			
	21.50								21.50	
									B.O.H.	

NV_DOT I-515 SOUNDWALLS.GPJ NV_DOT.GDT 8/26/08

EXPLORATION LOG

NEVADA DEPARTMENT OF TRANSPORTATION — GEOTECHNICAL ENGINEERING

START DATE 3/6/08
END DATE 3/6/08
JOB DESCRIPTION I-515 Soundwalls
LOCATION Nellis Blvd to Mountain Vista St
BORING SWA-09
E.A. #
GROUND ELEV. 1817.15 (ft)
HAMMER DROP SYSTEM Automatic

GROUNDWATER LEVEL		
DATE	DEPTH ft	ELEV. ft

STATION 672+53
OFFSET 52' RT
ENGINEER Ablahani
EQUIPMENT Diedrich D-120
OPERATOR White
DRILLING METHOD 6" H.S.A.
BACKFILLED Yes DATE 3/6/08

ELEV. (ft)	DEPTH (ft)	SAMPLE NO.	SAMPLE TYPE	BLOW COUNT 6 inch Increments	BLOW COUNT Last 1 foot	Percent Recov'd	LAB TESTS	USCS Group	MATERIAL DESCRIPTION	REMARKS
									P.C.C.P.	P.C.C.P. @ 12" Thick
	1.00									
									Clayey, Silty Sand with Gravel dense, dry.	
	2.50							**SC SM**		
		A	SPT	12 20 21	41	75	PI, S, W			Bulk Sample 1, 2.5'-5'.
	4.00									
	4.50									
1812.2	5 5.00								**Clayey, Silty Sand** dense, dry.	
		B	SPT	9 15 25	40	100	PI, S, W			
	6.50									
1807.2	10 10.00									
		C	SPT	18 14 28	42	100	PI, S, W	**SC SM**		
	11.50									
1802.2	15 15.00									
		D	SPT	14 14 12	26	95	PI, S, W			
	16.50									
	18.00									
									Clayey Sand with Gravel medium dense, light tan.	
1797.2	20 20.00							**SC**		
		E	SPT	5 6 12	18	80	PI, S, W			
	21.50									
									B.O.H.	

EXPLORATION LOG

NEVADA DEPARTMENT OF TRANSPORTATION — GEOTECHNICAL ENGINEERING

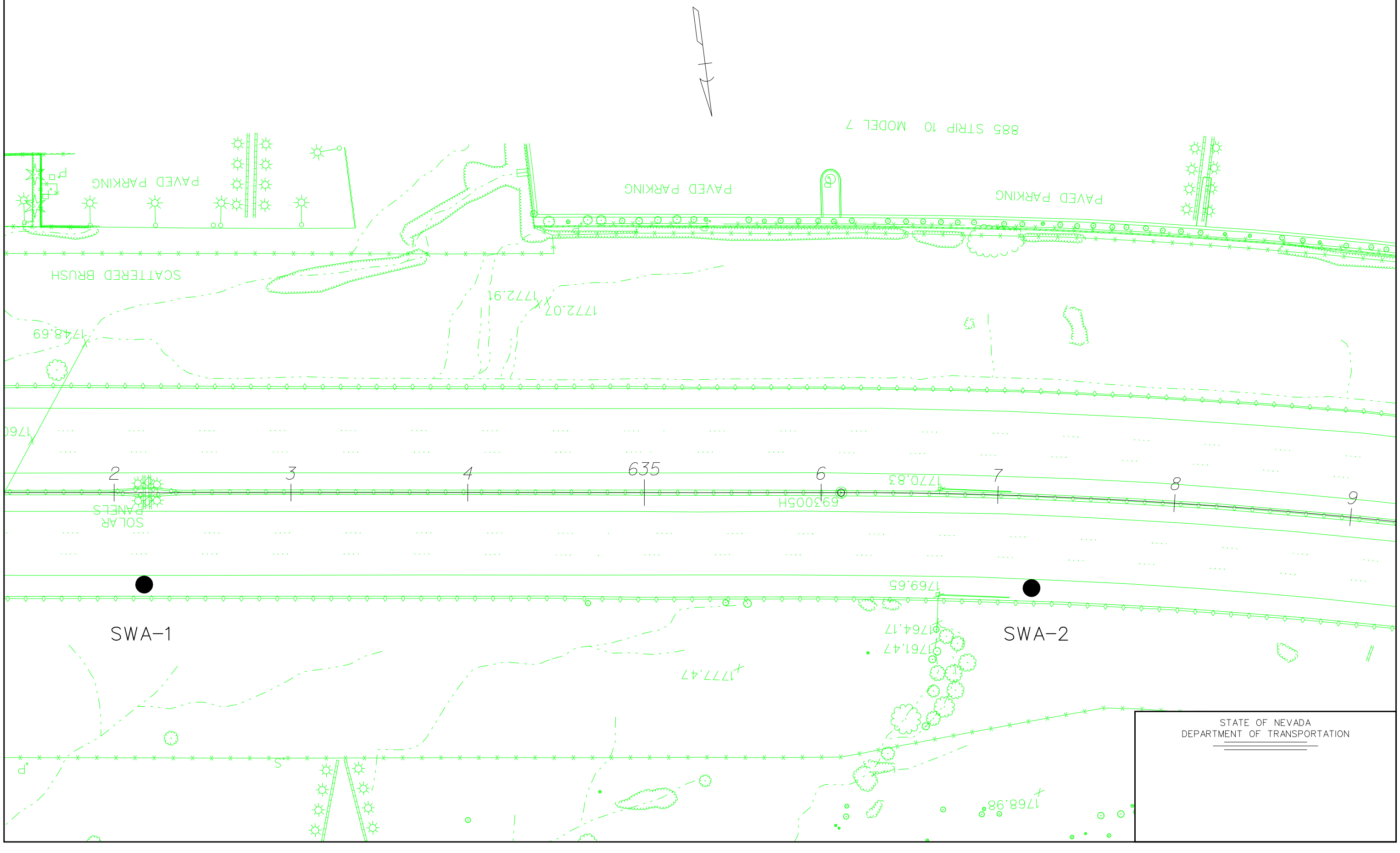
START DATE 3/7/08
END DATE 3/7/08
JOB DESCRIPTION I-515 Soundwalls
LOCATION Nellis Blvd to Mountain Vista St
BORING SWA-10
E.A. #
GROUND ELEV. 1807.89 (ft)
HAMMER DROP SYSTEM Automatic

GROUNDWATER LEVEL		
DATE	DEPTH ft	ELEV. ft

STATION 677+57
OFFSET 52' RT
ENGINEER Ablahani
EQUIPMENT Diedrich D-120
OPERATOR White
DRILLING METHOD 6" H.S.A.
BACKFILLED Yes DATE 3/7/08

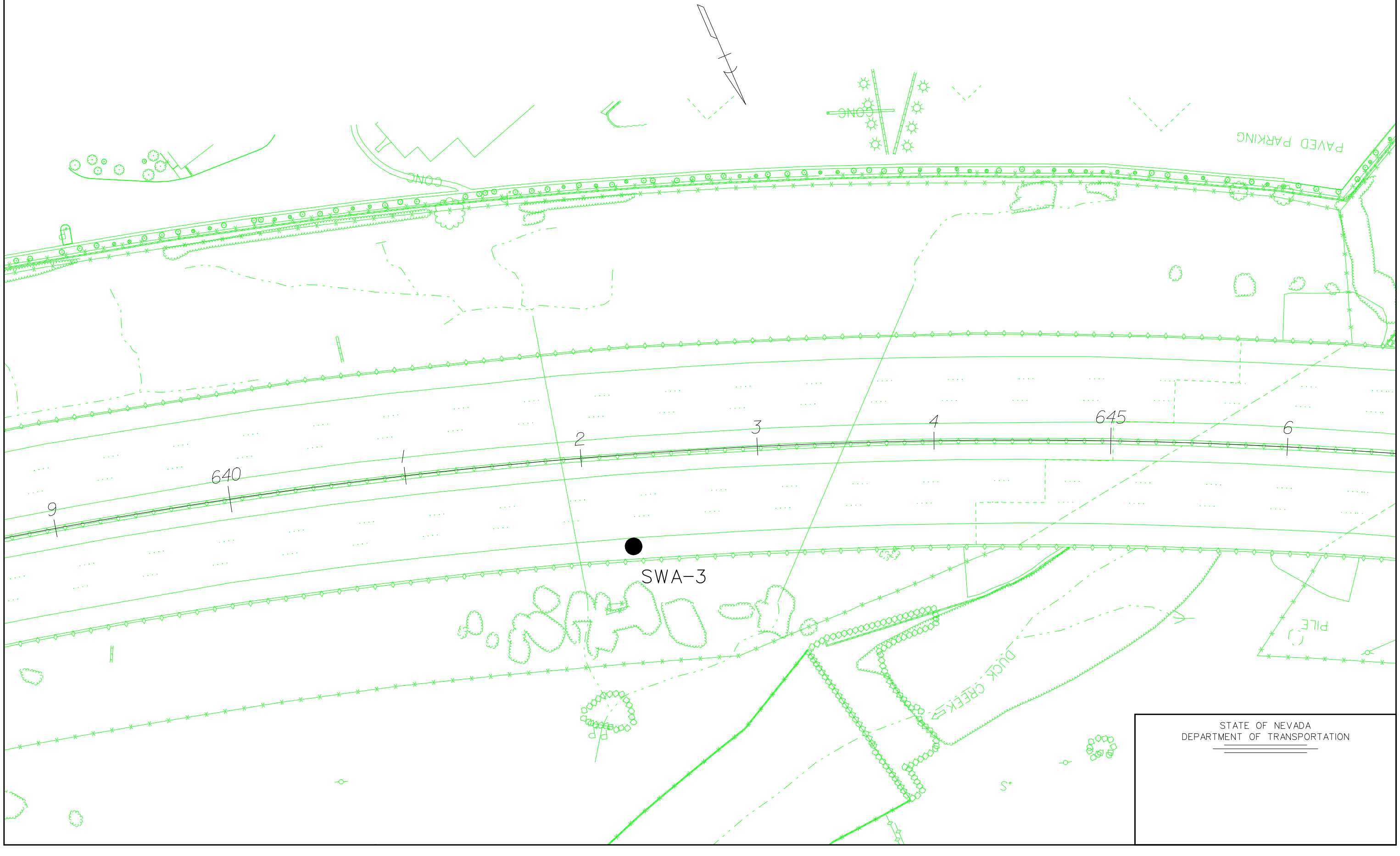
ELEV. (ft)	DEPTH (ft)	SAMPLE NO.	SAMPLE TYPE	BLOW COUNT 6 inch Increments	BLOW COUNT Last 1 foot	Percent Recov'd	LAB TESTS	USCS Group	MATERIAL DESCRIPTION	REMARKS
									P.C.C.P.	
	1.00									
								SC	**Clayey Sand with Gravel** very dense, dry.	P.C.C.P. @ 11.5" Thick
	2.50 2.70	A	SPT	15/.2'	15/.2'	0				Bulk Sample 1, 2'-5'.
	3.50									(A) 10 blows with no progress. No Recovery.
									Silty Sand with Gravel dense, dry.	
1802.9	5.00 5									Very hard drilling 2.5'-3.5'. Probable boulder.
	6.50	B	SPT	12 16 22	38	95	PI, S, W	SM		
	7.00									
	7.50								**Sandy Lean Clay** medium stiff.	
	9.00	C	SPT	3 2 5	7	115	PI, S, W	CL		
	10.00									
1797.9	10									
									Clayey Sand with Gravel medium dense to dense.	
	11.50	D	CMS	7 8 15	23	100	PI, S, W, UW			
	13.00	E	SPT	12 12 36	48	80	PI, S, W			(E) Pulverized rock in sample.
								SC		
	15.00									
1792.9	15									
	16.50	F	SPT	2 6 12	18	35	PI, S, W			(F) Rock in sampler shoe.
	18.00									
									Sandy Lean Clay very stiff, moist to wet.	
	20.00									
1787.9	20									
	21.50	G	SPT	1 5 14	19	100	PI, S, W			
								CL		
	25.00									
1782.9	25									
	26.50	H	SPT	4 9 12	21	105	PI, S, W			(H) Free water.
	26.50								**B.O.H.**	

STATE	PROJECT NO.	COUNTY	SHEET NO.
NEVADA	I-515 SOUND WALL	CLARK	1



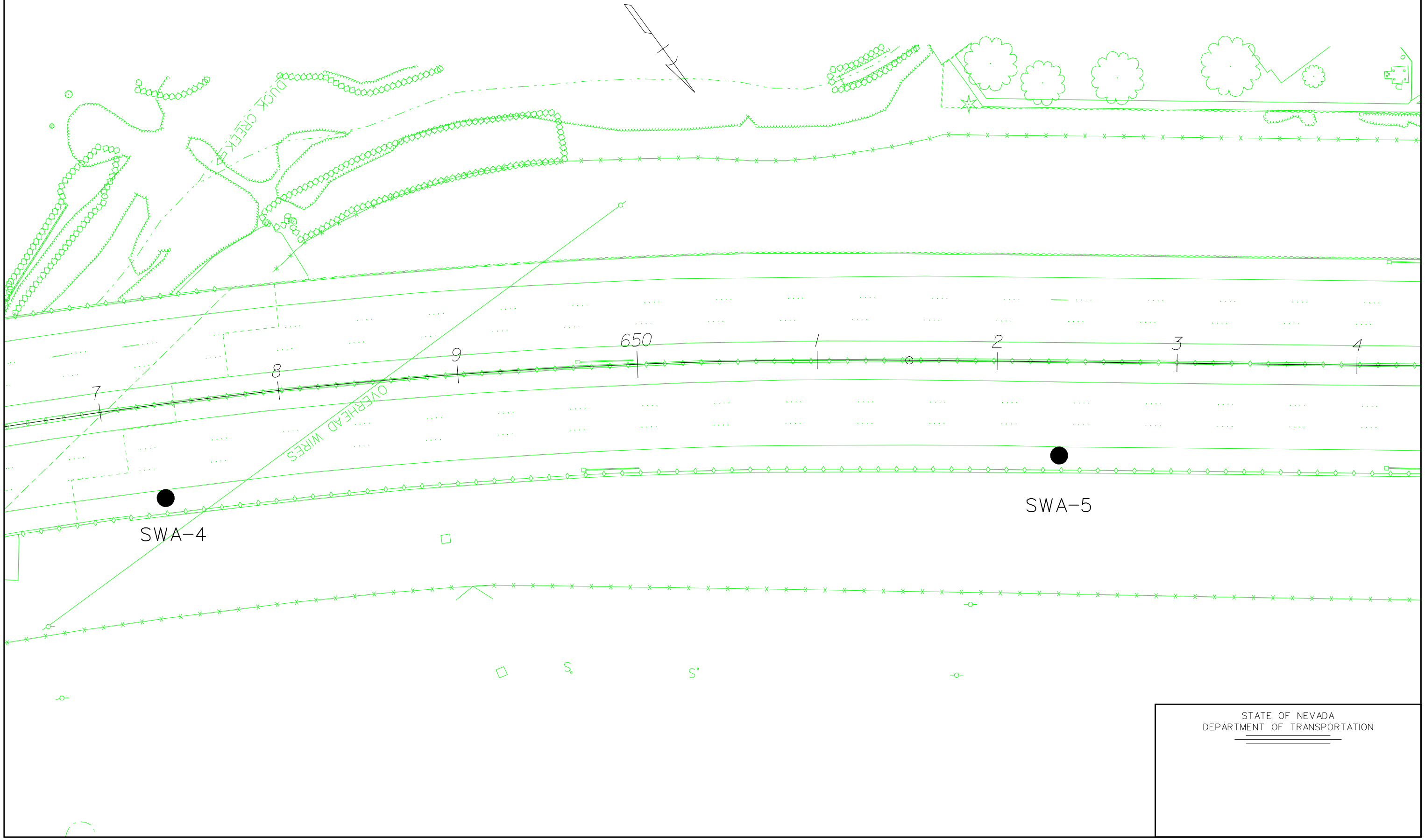
STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

STATE	PROJECT NO.	COUNTY	SHEET NO.
NEVADA	I-515 SOUND WALL	CLARK	2



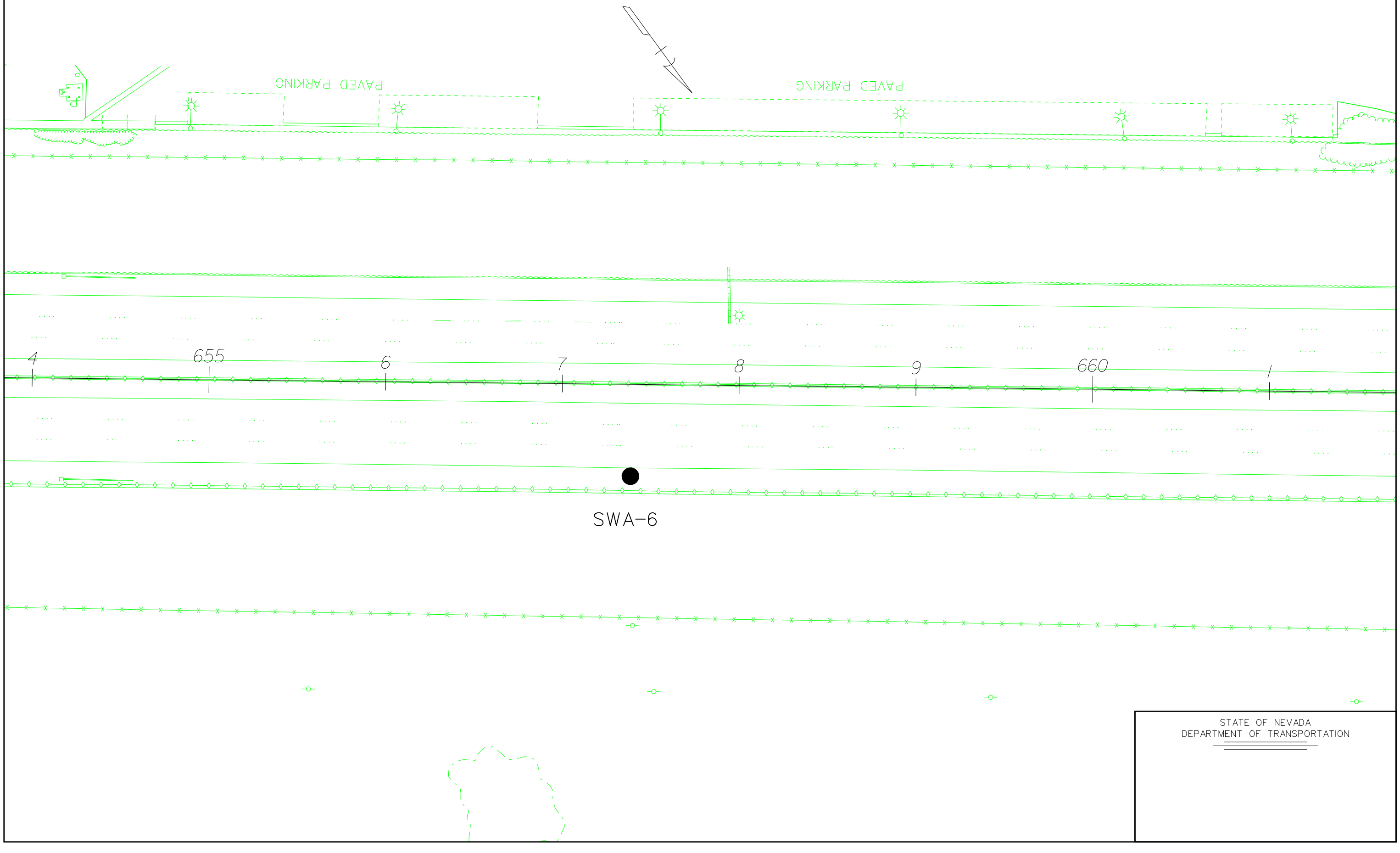
STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

STATE	PROJECT NO.	COUNTY	SHEET NO.
NEVADA	I-515 SOUND WALL	CLARK	3



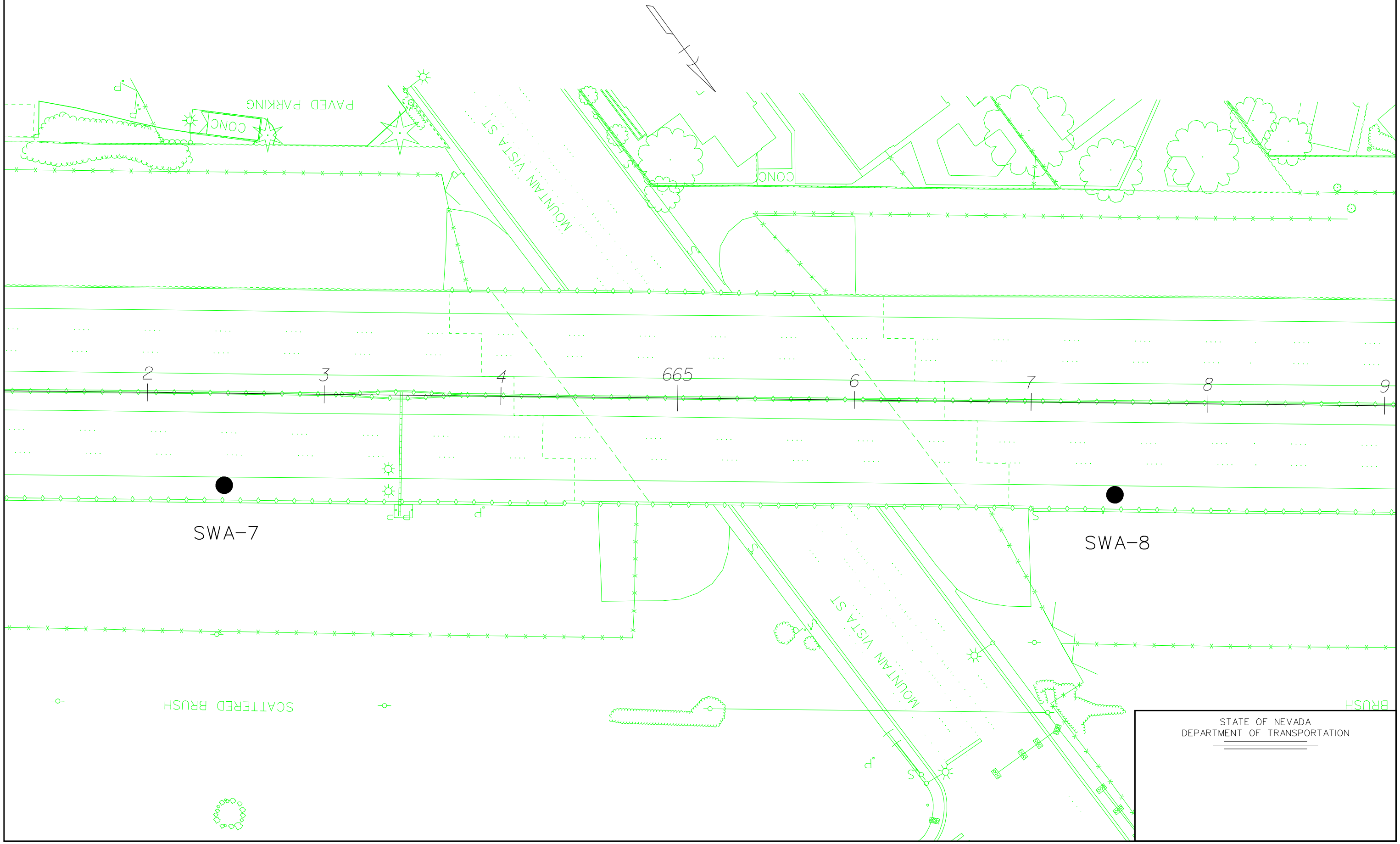
STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

STATE	PROJECT NO.	COUNTY	SHEET NO.
NEVADA	I-515 SOUND WALL	CLARK	4



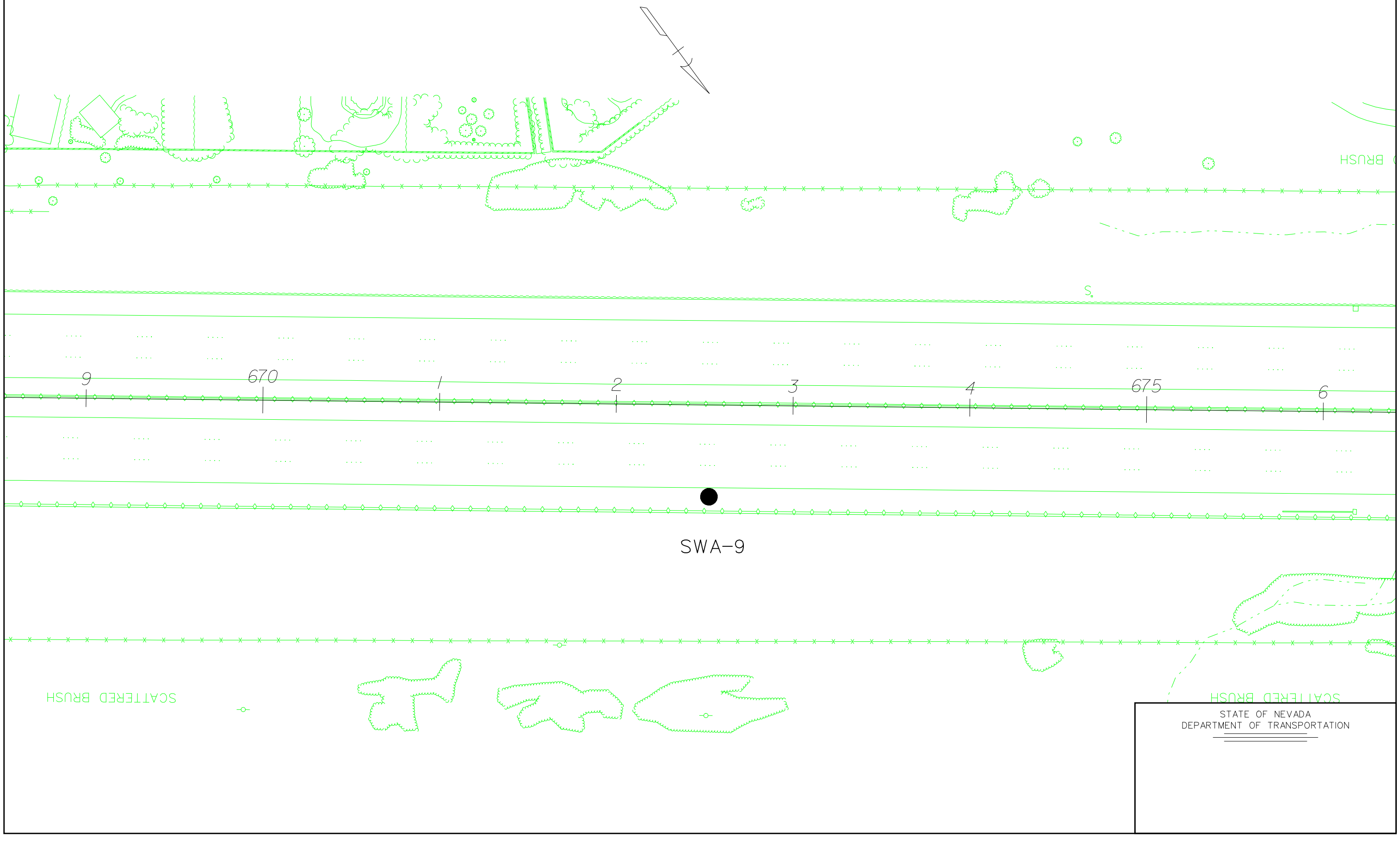
STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

STATE	PROJECT NO.	COUNTY	SHEET NO.
NEVADA	I-515 SOUND WALL	CLARK	5



STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

STATE	PROJECT NO.	COUNTY	SHEET NO.
NEVADA	I-515 SOUND WALL	CLARK	6



STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

STATE	PROJECT NO.	COUNTY	SHEET NO.
NEVADA	I-515 SOUND WALL	CLARK	7

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

APPENDIX B

Summary of Test Results Tables
Particle Size Distribution Reports
Direct Shear Test Reports

SUMMARY OF RESULTS
N.D.O.T. GEOTECHNICAL SECTION

EA/Cont # **Job Description** I - 515 Soundwalls, Nellis to Mtn. Vista

Boring No. SWA - 1 **Elevation (ft)** **Station** **Date** 03/11/2008

SAMPLE NO.	SAMPLE DEPTH (ft)	SAMP-LER TYPE	N BLOWS per ft.	SOIL GROUP	W%	DRY UW pcf	% PASS #200	LL %	PL %	PI %	STRENGTH TEST					COMMENTS
											TEST TYPE	φ deg.	C psi	φ deg.	C psi	
												Peak		Residual		
A	3.0 - 4.5	SPT	31	SC	10.8		25.2	33	23	10						
B	5.0 - 6.5	SPT	18	SC	15.4		39.6	38	19	19						
C1	7.7 - 8.2	CMS	26	GC	16.3		38.3	43	17	26						
C2	8.2 - 8.7	CMS		SM	17.5		49.1	44	17	27						
D	9.0 - 10.0	SPT	35	CL	11.7		76.8	35	16	19						
E	10.0 - 11.4	SPT	R	SC	14.3		38.2	49	17	32						
F	12.5 - 13.4	SPT	R	SC	12.6		29.0	33	18	15						
G	17.5 - 19.0	SPT	100	CL	16.7		55.5	36	19	17						
H	22.5 - 24.0	SPT	45	CL	21.9		52.6	33	19	14						
BULK 1	3.0 - 5.0			SC			22.7	37	24	13						RV = 72

CMS = California Modified Sampler 2.40" ID
SPT = Standard Penetration 1.38" ID
CS = Continuous Sample 3.23" ID
RC = Rock Core
PB = Pitcher Barrel
CSS = Calif. Split Spoon 2.42" ID
CPT = Cone Penetration Test
TP = Test Pit
P = Pushed, not driven
R = Refusal
Sh = Shelby Tube 2.87" ID

U = Unconfined Compressive
UU = Unconsolidated Undrained
CD = Consolidated Drained
CU = Consolidated Undrained
DS = Direct Shear
φ = Friction
C = Cohesion
N = No. of blows per ft., sampler

N = Field SPT N = $(N_{css})(0.62)$

H = Hydrometer
S = Sieve
G = Specific Gravity
PI = Plasticity Index
LL = Liquid Limit
PL = Plastic Limit
NP = Non-Plastic
OC = Consolidation
Ch = Chemical
RV = R - Value
MD = Moisture Density

CM = Compaction
E = Swell/Pressure on Expansive Soils
SL = Shrinkage Limit
UW= Unit Weight
W = Moisture Content
K = Permeability
O = Organic Content
D = Dispersive
RQD = Rock Quality Designation
X = X-Ray Defraction
HCpot = Hydro-Collapse Potential

*** = Average of subsamples**

SUMMARY OF RESULTS
N.D.O.T. GEOTECHNICAL SECTION

EA/Cont # **Job Description** I - 515 Soundwalls, Nellis to Mtn. Vista

Boring No. SWA - 2 **Elevation (ft)** **Station** **Date** 03/11/2008

SAMPLE NO.	SAMPLE DEPTH (ft)	SAMP-LER TYPE	N BLOWS per ft.	SOIL GROUP	W%	DRY UW pcf	% PASS #200	LL %	PL %	PI %	STRENGTH TEST					COMMENTS
											TEST TYPE	φ deg.	C psi	φ deg.	C psi	
												Peak		Residual		
A	3.0 - 4.5	SPT	8	CL	19.4		53.7	44	16	28						
B1	5.0 - 6.0	SPT	21	CL	22.5		53.6	48	17	31						
B2	6.0 - 6.5	SPT			8.4		17.8									
C1	7.2 - 7.7	CMS	42	CL	23.2	79.0	69.7	46	18	28						
C2	7.7 - 8.2	CMS		GC	12.2	101.3	28.6	48	19	29						
D	8.5 - 9.5	SPT	54	SC	14.2		38.6	40	18	22						
E	10.0 - 11.5	SPT	R	SC	10.0		32.4	35	17	18						
F	14.0 - 15.5	SPT	52	SC	18.6		48.0	37	19	18						
G	19.0 - 20.5	SPT	31	CL	24.8		84.7	39	19	20						
H	24.0 - 25.5	SPT	40	CL	24.3		66.9	31	21	10						
BULK 1	3.0 - 5.0			SC			40.8	37	16	21						RV = 20

CMS = California Modified Sampler 2.40" ID
SPT = Standard Penetration 1.38" ID
CS = Continuous Sample 3.23" ID
RC = Rock Core
PB = Pitcher Barrel
CSS = Calif. Split Spoon 2.42" ID
CPT = Cone Penetration Test
TP = Test Pit
P = Pushed, not driven
R = Refusal
Sh = Shelby Tube 2.87" ID

U = Unconfined Compressive
UU = Unconsolidated Undrained
CD = Consolidated Drained
CU = Consolidated Undrained
DS = Direct Shear
φ = Friction
C = Cohesion
N = No. of blows per ft., sampler

N = Field SPT N = $(N_{css})(0.62)$

H = Hydrometer
S = Sieve
G = Specific Gravity
PI = Plasticity Index
LL = Liquid Limit
PL = Plastic Limit
NP = Non-Plastic
OC = Consolidation
Ch = Chemical
RV = R - Value
MD = Moisture Density

CM = Compaction
E = Swell/Pressure on Expansive Soils
SL = Shrinkage Limit
UW= Unit Weight
W = Moisture Content
K = Permeability
O = Organic Content
D = Dispersive
RQD = Rock Quality Designation
X = X-Ray Defraction
HCpot = Hydro-Collapse Potential

*** = Average of subsamples**

SUMMARY OF RESULTS
N.D.O.T. GEOTECHNICAL SECTION

EA/Cont # **Job Description** I - 515 Soundwalls, Nellis to Mtn. Vista

Boring No. SWA - 3 **Elevation (ft)** **Station** **Date** 03/11/2008

SAMPLE NO.	SAMPLE DEPTH (ft)	SAMP-LER TYPE	N BLOWS per ft.	SOIL GROUP	W%	DRY UW pcf	% PASS #200	LL %	PL %	PI %	STRENGTH TEST					COMMENTS
											TEST TYPE	φ deg. (Peak)	C psi (Peak)	φ deg. (Residual)	C psi (Residual)	
A	2.5 - 4.0	SPT	31	SM	9.5		21.3	27	NP	NP						
B1	5.0 - 6.2	SPT	20	SC-SM	13.5		44.4	26	21	5						
B2	6.2 - 6.5	SPT			17.9			43	17	26						
C1	8.2 - 8.7	CMS	19	CL	20.5	100.0	58.7	46	18	28						
C2	8.7 - 9.2	CMS		CL	22.3	97.5	58.1	42	15	27						
D	9.5 - 11.0	SPT	18	SC-SM	13.0		43.2	36	22	14						
E1	12.7 - 13.2	CMS	7	CL-ML	13.1	86.3	55.6	26	22	4						
E2	13.2 - 13.7	CMS		CL	17.6	80.0	75.0	29	18	11	DS	29	0.07	29	0	
F	14.0 - 15.5	SPT	10	CL	13.4		50.2	30	20	10						
G1	17.7 - 18.2	CMS	36	CL	20.6	98.0	72.4	39	17	22						
G2	18.2 - 18.7	CMS		CL	24.5	94.6	54.8	46	18	28						
H	19.0 - 20.0	SPT	43	SC-SM	11.1		36.9	25	18	7						

CMS = California Modified Sampler 2.40" ID
SPT = Standard Penetration 1.38" ID
CS = Continuous Sample 3.23" ID
RC = Rock Core
PB = Pitcher Barrel
CSS = Calif. Split Spoon 2.42" ID
CPT = Cone Penetration Test
TP = Test Pit
P = Pushed, not driven
R = Refusal
Sh = Shelby Tube 2.87" ID

U = Unconfined Compressive
UU = Unconsolidated Undrained
CD = Consolidated Drained
CU = Consolidated Undrained
DS = Direct Shear
φ = Friction
C = Cohesion
N = No. of blows per ft., sampler

N = Field SPT N = $(N_{css})(0.62)$

H = Hydrometer
S = Sieve
G = Specific Gravity
PI = Plasticity Index
LL = Liquid Limit
PL = Plastic Limit
NP = Non-Plastic
OC = Consolidation
Ch = Chemical
RV = R - Value
MD = Moisture Density

CM = Compaction
E = Swell/Pressure on Expansive Soils
SL = Shrinkage Limit
UW= Unit Weight
W = Moisture Content
K = Permeability
O = Organic Content
D = Dispersive
RQD = Rock Quality Designation
X = X-Ray Defraction
HCpot = Hydro-Collapse Potential

*** = Average of subsamples**

SUMMARY OF RESULTS
N.D.O.T. GEOTECHNICAL SECTION

EA/Cont # **Job Description** I - 515 Soundwalls, Nellis to Mtn. Vista

Boring No. SWA - 3 **Elevation (ft)** **Station** **Date** 03/11/2008

SAMPLE NO.	SAMPLE DEPTH (ft)	SAMP-LER TYPE	N BLOWS per ft.	SOIL GROUP	W%	DRY UW pcf	% PASS #200	LL %	PL %	PI %	STRENGTH TEST					COMMENTS
											TEST TYPE	φ deg.	C psi	φ deg.	C psi	
												Peak		Residual		
I	25.0 - 26.5	SPT	20	CL	31.9		95.0	49	19	30						
BULK 1	3.0 - 5.0			SC			20.4	32	23	9						RV = 64

CMS = California Modified Sampler 2.40" ID
SPT = Standard Penetration 1.38" ID
CS = Continuous Sample 3.23" ID
RC = Rock Core
PB = Pitcher Barrel
CSS = Calif. Split Spoon 2.42" ID
CPT = Cone Penetration Test
TP = Test Pit
P = Pushed, not driven
R = Refusal
Sh = Shelby Tube 2.87" ID

U = Unconfined Compressive
UU = Unconsolidated Undrained
CD = Consolidated Drained
CU = Consolidated Undrained
DS = Direct Shear
φ = Friction
C = Cohesion
N = No. of blows per ft., sampler

N = Field SPT N = $(N_{css})(0.62)$

H = Hydrometer
S = Sieve
G = Specific Gravity
PI = Plasticity Index
LL = Liquid Limit
PL = Plastic Limit
NP = Non-Plastic
OC = Consolidation
Ch = Chemical
RV = R - Value
MD = Moisture Density

CM = Compaction
E = Swell/Pressure on Expansive Soils
SL = Shrinkage Limit
UW= Unit Weight
W = Moisture Content
K = Permeability
O = Organic Content
D = Dispersive
RQD = Rock Quality Designation
X = X-Ray Defraction
HCpot = Hydro-Collapse Potential

*** = Average of subsamples**

SUMMARY OF RESULTS
N.D.O.T. GEOTECHNICAL SECTION

EA/Cont # **Job Description** I - 515 Soundwalls, Nellis to Mtn. Vista

Boring No. SWA - 4 **Elevation (ft)** **Station** **Date** 03/11/2008

SAMPLE NO.	SAMPLE DEPTH (ft)	SAMP-LER TYPE	N BLOWS per ft.	SOIL GROUP	W%	DRY UW pcf	% PASS #200	LL %	PL %	PI %	STRENGTH TEST					COMMENTS
											TEST TYPE	φ deg.	C psi	φ deg.	C psi	
												Peak		Residual		
A	2.5 - 4.0	SPT	52	SC	8.3		18.6	32	23	9						
B	4.0 - 5.5	SPT	53	SM	6.6		16.2	34	25	9						
C	7.5 - 9.0	SPT	54	SC-SM	7.4		16.5	29	22	7						
D	10.0 - 11.5	SPT	57	SC	8.7		19.9	30	22	8						
E	12.0 - 13.5	SPT	48	SC	10.1		33.2	32	21	11						
F	17.0 - 18.5	SPT	14	CL	16.5		59.0	29	18	11						
G	22.0 - 23.5	SPT	13	CL	20.3		66.8	30	20	10						
BULK 1	3.0 - 5.0			SC			18.5	29	21	8						RV = 75

CMS = California Modified Sampler 2.40" ID
SPT = Standard Penetration 1.38" ID
CS = Continuous Sample 3.23" ID
RC = Rock Core
PB = Pitcher Barrel
CSS = Calif. Split Spoon 2.42" ID
CPT = Cone Penetration Test
TP = Test Pit
P = Pushed, not driven
R = Refusal
Sh = Shelby Tube 2.87" ID

U = Unconfined Compressive
UU = Unconsolidated Undrained
CD = Consolidated Drained
CU = Consolidated Undrained
DS = Direct Shear
φ = Friction
C = Cohesion
N = No. of blows per ft., sampler

N = Field SPT N = $(N_{css})(0.62)$

H = Hydrometer
S = Sieve
G = Specific Gravity
PI = Plasticity Index
LL = Liquid Limit
PL = Plastic Limit
NP = Non-Plastic
OC = Consolidation
Ch = Chemical
RV = R - Value
MD = Moisture Density

CM = Compaction
E = Swell/Pressure on Expansive Soils
SL = Shrinkage Limit
UW= Unit Weight
W = Moisture Content
K = Permeability
O = Organic Content
D = Dispersive
RQD = Rock Quality Designation
X = X-Ray Defraction
HCpot = Hydro-Collapse Potential

*** = Average of subsamples**

SUMMARY OF RESULTS
N.D.O.T. GEOTECHNICAL SECTION

EA/Cont # **Job Description** I - 515 Soundwalls, Nellis to Mtn. Vista

Boring No. SWA - 5 **Elevation (ft)** **Station** **Date** 03/11/2008

SAMPLE NO.	SAMPLE DEPTH (ft)	SAMP-LER TYPE	N BLOWS per ft.	SOIL GROUP	W%	DRY UW pcf	% PASS #200	LL %	PL %	PI %	STRENGTH TEST					COMMENTS
											TEST TYPE	φ deg.	C psi	φ deg.	C psi	
												Peak		Residual		
A	2.5 - 4.0	SPT	R	SM	6.9		20.9	26	23	3						
B	5.0 - 6.5	SPT	34	SM	6.7		15.7	28	25	3						
C	7.5 - 9.0	SPT	14	CL	17.1		53.8	29	21	8						
D	10.0 - 11.5	SPT	16	CL	16.0		54.2	38	17	21						
E	12.5 - 14.0	SPT	33	CL	16.9		61.4	38	15	23						
F	17.5 - 19.0	SPT	13	ML	13.8		55.0	24	21	3						
G	22.5 - 24.0	SPT	16	CL	20.1		73.6	25	17	8						
BULK 1	20. - 5.0			SC			18.1	28	20	8						RV = 56

CMS = California Modified Sampler 2.40" ID
SPT = Standard Penetration 1.38" ID
CS = Continuous Sample 3.23" ID
RC = Rock Core
PB = Pitcher Barrel
CSS = Calif. Split Spoon 2.42" ID
CPT = Cone Penetration Test
TP = Test Pit
P = Pushed, not driven
R = Refusal
Sh = Shelby Tube 2.87" ID

U = Unconfined Compressive
UU = Unconsolidated Undrained
CD = Consolidated Drained
CU = Consolidated Undrained
DS = Direct Shear
φ = Friction
C = Cohesion
N = No. of blows per ft., sampler

N = Field SPT N = $(N_{css})(0.62)$

H = Hydrometer
S = Sieve
G = Specific Gravity
PI = Plasticity Index
LL = Liquid Limit
PL = Plastic Limit
NP = Non-Plastic
OC = Consolidation
Ch = Chemical
RV = R - Value
MD = Moisture Density

CM = Compaction
E = Swell/Pressure on Expansive Soils
SL = Shrinkage Limit
UW= Unit Weight
W = Moisture Content
K = Permeability
O = Organic Content
D = Dispersive
RQD = Rock Quality Designation
X = X-Ray Defraction
HCpot = Hydro-Collapse Potential

*** = Average of subsamples**

SUMMARY OF RESULTS
N.D.O.T. GEOTECHNICAL SECTION

EA/Cont # **Job Description** I - 515 Soundwalls, Nellis to Mtn. Vista

Boring No. SWA - 6 **Elevation (ft)** **Station** **Date** 03/11/2008

SAMPLE NO.	SAMPLE DEPTH (ft)	SAMP-LER TYPE	N BLOWS per ft.	SOIL GROUP	W%	DRY UW pcf	% PASS #200	LL %	PL %	PI %	STRENGTH TEST					COMMENTS
											TEST TYPE	φ deg.	C psi	φ deg.	C psi	
												Peak		Residual		
A	2.5 - 2.9	SPT	R	SM	3.2		18.8	30	26	4						
B	5.0 - 6.5	SPT	60	SC-SM	6.2		12.4	24	19	5						
C	7.5 - 9.0	SPT	49	SC-SM	8.0		17.9	30	21	9						
D	10.0 - 11.5	SPT	42		10.8		27.0									
E	12.5 - 14.0	SPT	48	SM	9.6		28.2	40	27	13						
F	17.5 - 19.0	SPT	60	SC	9.7		19.5	41	25	16						
G	25.0 - 26.5	SPT	38	SC	13.0		49.1	36	15	21						
BULK 1	2.5 - 5.0			SC-SM			17.0	27	20	7						RV = 77

CMS = California Modified Sampler 2.40" ID
SPT = Standard Penetration 1.38" ID
CS = Continuous Sample 3.23" ID
RC = Rock Core
PB = Pitcher Barrel
CSS = Calif. Split Spoon 2.42" ID
CPT = Cone Penetration Test
TP = Test Pit
P = Pushed, not driven
R = Refusal
Sh = Shelby Tube 2.87" ID

U = Unconfined Compressive
UU = Unconsolidated Undrained
CD = Consolidated Drained
CU = Consolidated Undrained
DS = Direct Shear
φ = Friction
C = Cohesion
N = No. of blows per ft., sampler

N = Field SPT N = $(N_{css})(0.62)$

H = Hydrometer
S = Sieve
G = Specific Gravity
PI = Plasticity Index
LL = Liquid Limit
PL = Plastic Limit
NP = Non-Plastic
OC = Consolidation
Ch = Chemical
RV = R - Value
MD = Moisture Density

CM = Compaction
E = Swell/Pressure on Expansive Soils
SL = Shrinkage Limit
UW= Unit Weight
W = Moisture Content
K = Permeability
O = Organic Content
D = Dispersive
RQD = Rock Quality Designation
X = X-Ray Defraction
HCpot = Hydro-Collapse Potential

*** = Average of subsamples**

SUMMARY OF RESULTS
N.D.O.T. GEOTECHNICAL SECTION

EA/Cont # **Job Description** I - 515 Soundwalls, Nellis to Mtn. Vista

Boring No. SWA - 7 **Elevation (ft)** **Station** **Date** 03/11/2008

SAMPLE NO.	SAMPLE DEPTH (ft)	SAMP-LER TYPE	N BLOWS per ft.	SOIL GROUP	W%	DRY UW pcf	% PASS #200	LL %	PL %	PI %	STRENGTH TEST					COMMENTS
											TEST TYPE	φ deg.	C psi	φ deg.	C psi	
												Peak		Residual		
A	2.5 - 3.7	SPT	R	SC	6.8		22.2	28	19	9						
B	5.0 - 6.5	SPT	42	SC	8.5		22.4	35	23	12						
C	7.5 - 9.0	SPT	41	SC	8.3		21.6	32	22	10						
D	10.0 - 11.5	SPT	20	SC	11.5		27.7	37	23	14						
E	12.5 - 14.0	SPT	53	SC	9.0		21.4	32	21	11						
F	15.0 - 16.5	SPT	35	SC	10.7		23.0	39	23	16						
BULK 1	2.0 - 5.0			SC-SM			16.0	24	18	6						RV = 68

CMS = California Modified Sampler 2.40" ID
SPT = Standard Penetration 1.38" ID
CS = Continuous Sample 3.23" ID
RC = Rock Core
PB = Pitcher Barrel
CSS = Calif. Split Spoon 2.42" ID
CPT = Cone Penetration Test
TP = Test Pit
P = Pushed, not driven
R = Refusal
Sh = Shelby Tube 2.87" ID

U = Unconfined Compressive
UU = Unconsolidated Undrained
CD = Consolidated Drained
CU = Consolidated Undrained
DS = Direct Shear
φ = Friction
C = Cohesion
N = No. of blows per ft., sampler

N = Field SPT N = $(N_{css})(0.62)$

H = Hydrometer
S = Sieve
G = Specific Gravity
PI = Plasticity Index
LL = Liquid Limit
PL = Plastic Limit
NP = Non-Plastic
OC = Consolidation
Ch = Chemical
RV = R - Value
MD = Moisture Density

CM = Compaction
E = Swell/Pressure on Expansive Soils
SL = Shrinkage Limit
UW= Unit Weight
W = Moisture Content
K = Permeability
O = Organic Content
D = Dispersive
RQD = Rock Quality Designation
X = X-Ray Defraction
HCpot = Hydro-Collapse Potential

*** = Average of subsamples**

SUMMARY OF RESULTS
N.D.O.T. GEOTECHNICAL SECTION

EA/Cont # **Job Description** I - 515 Soundwalls, Nellis to Mtn. Vista

Boring No. SWA - 8 **Elevation (ft)** **Station** **Date** 03/11/2008

SAMPLE NO.	SAMPLE DEPTH (ft)	SAMP-LER TYPE	N BLOWS per ft.	SOIL GROUP	W%	DRY UW pcf	% PASS #200	LL %	PL %	PI %	STRENGTH TEST					COMMENTS
											TEST TYPE	φ deg.	C psi	φ deg.	C psi	
												Peak		Residual		
A	2.5 - 4.0	SPT	35	SM	10.1		26.2	37	27	10						
B	5.0 - 6.5	SPT	43	SM	8.6		21.6	35	27	8						
C	7.5 - 9.0	SPT	43	SM	9.3		22.9	38	28	10						
D	10.0 - 11.5	SPT	32	SC	10.8		24.3	39	24	15						
E	12.5 - 14.0	SPT	48		8.2		19.8									
F	15.0 - 16.5	SPT	31	SM	10.8		28.6	40	31	9						
G	20.0 - 21.5	SPT	61	SM	8.4		15.3	29	23	6						
BULK 1	2.0 - 5.0			SC			24.8	40	24	16						RV = 26

CMS = California Modified Sampler 2.40" ID
SPT = Standard Penetration 1.38" ID
CS = Continuous Sample 3.23" ID
RC = Rock Core
PB = Pitcher Barrel
CSS = Calif. Split Spoon 2.42" ID
CPT = Cone Penetration Test
TP = Test Pit
P = Pushed, not driven
R = Refusal
Sh = Shelby Tube 2.87" ID

U = Unconfined Compressive
UU = Unconsolidated Undrained
CD = Consolidated Drained
CU = Consolidated Undrained
DS = Direct Shear
φ = Friction
C = Cohesion
N = No. of blows per ft., sampler

N = Field SPT N = $(N_{css})(0.62)$

H = Hydrometer
S = Sieve
G = Specific Gravity
PI = Plasticity Index
LL = Liquid Limit
PL = Plastic Limit
NP = Non-Plastic
OC = Consolidation
Ch = Chemical
RV = R - Value
MD = Moisture Density

CM = Compaction
E = Swell/Pressure on Expansive Soils
SL = Shrinkage Limit
UW= Unit Weight
W = Moisture Content
K = Permeability
O = Organic Content
D = Dispersive
RQD = Rock Quality Designation
X = X-Ray Defraction
HCpot = Hydro-Collapse Potential

*** = Average of subsamples**

SUMMARY OF RESULTS
N.D.O.T. GEOTECHNICAL SECTION

EA/Cont # **Job Description** I - 515 Soundwalls, Nellis to Mtn. Vista

Boring No. SWA - 9 **Elevation (ft)** **Station** **Date** 03/11/2008

SAMPLE NO.	SAMPLE DEPTH (ft)	SAMP-LER TYPE	N BLOWS per ft.	SOIL GROUP	W%	DRY UW pcf	% PASS #200	LL %	PL %	PI %	STRENGTH TEST					COMMENTS
											TEST TYPE	φ deg.	C psi	φ deg.	C psi	
												Peak		Residual		
A	2.5 - 4.0	SPT	41	SM	8.6		23.2	39	29	10						
B	5.0 - 6.5	SPT	40	SM	12.9		30.0	47	32	15						
C	10.0 - 11.5	SPT	42	SC	11.4		29.0	30	22	8						
D	15.0 - 16.5	SPT	26	SM	8.4		16.9	37	29	8						
E	20.0 - 21.5	SPT	18	SC	13.8		44.9	32	15	17						
BULK 1	2.5 - 5.0			SC			27.7	40	23	17						RV = 56

CMS = California Modified Sampler 2.40" ID
SPT = Standard Penetration 1.38" ID
CS = Continuous Sample 3.23" ID
RC = Rock Core
PB = Pitcher Barrel
CSS = Calif. Split Spoon 2.42" ID
CPT = Cone Penetration Test
TP = Test Pit
P = Pushed, not driven
R = Refusal
Sh = Shelby Tube 2.87" ID

U = Unconfined Compressive
UU = Unconsolidated Undrained
CD = Consolidated Drained
CU = Consolidated Undrained
DS = Direct Shear
φ = Friction
C = Cohesion
N = No. of blows per ft., sampler

N = Field SPT N = $(N_{css})(0.62)$

H = Hydrometer
S = Sieve
G = Specific Gravity
PI = Plasticity Index
LL = Liquid Limit
PL = Plastic Limit
NP = Non-Plastic
OC = Consolidation
Ch = Chemical
RV = R - Value
MD = Moisture Density

CM = Compaction
E = Swell/Pressure on Expansive Soils
SL = Shrinkage Limit
UW= Unit Weight
W = Moisture Content
K = Permeability
O = Organic Content
D = Dispersive
RQD = Rock Quality Designation
X = X-Ray Defraction
HCpot = Hydro-Collapse Potential

*** = Average of subsamples**

SUMMARY OF RESULTS
N.D.O.T. GEOTECHNICAL SECTION

EA/Cont # **Job Description** I - 515 Soundwalls, Nellis to Mtn. Vista

Boring No. SWA - 10 **Elevation (ft)** **Station** **Date** 03/11/2008

SAMPLE NO.	SAMPLE DEPTH (ft)	SAMP-LER TYPE	N BLOWS per ft.	SOIL GROUP	W%	DRY UW pcf	% PASS #200	LL %	PL %	PI %	STRENGTH TEST					COMMENTS
											TEST TYPE	φ deg.	C psi	φ deg.	C psi	
												Peak		Residual		
B	5.0 - 6.5	SPT	38	SM	9.8		23.2	35	28	7						
C	7.5 - 9.0	SPT	7	CL	18.3		55.1	40	15	25						
D1	10.2 - 10.7	CMS	23	SC	15.5		45.1	36	14	22						
D2	10.7 - 11.2	CMS			18.5	107.0	61.6									
E	11.5 - 13.0	SPT	48	SC	10.6		40.5	31	16	15						
F	15.0 - 16.5	SPT	18	SC	14.3		45.7	38	19	19						
G	20.0 - 21.5	SPT	19	CL	24.8		59.0	30	18	12						
H	25.0 - 26.5	SPT	21	CL	23.4		53.6	28	17	11						
BULK 1	2.0 - 5.0			SC			26.2	26	18	8						RV = 72

CMS = California Modified Sampler 2.40" ID
SPT = Standard Penetration 1.38" ID
CS = Continuous Sample 3.23" ID
RC = Rock Core
PB = Pitcher Barrel
CSS = Calif. Split Spoon 2.42" ID
CPT = Cone Penetration Test
TP = Test Pit
P = Pushed, not driven
R = Refusal
Sh = Shelby Tube 2.87" ID

U = Unconfined Compressive
UU = Unconsolidated Undrained
CD = Consolidated Drained
CU = Consolidated Undrained
DS = Direct Shear
φ = Friction
C = Cohesion
N = No. of blows per ft., sampler

N = Field SPT N = $(N_{css})(0.62)$

H = Hydrometer
S = Sieve
G = Specific Gravity
PI = Plasticity Index
LL = Liquid Limit
PL = Plastic Limit
NP = Non-Plastic
OC = Consolidation
Ch = Chemical
RV = R - Value
MD = Moisture Density

CM = Compaction
E = Swell/Pressure on Expansive Soils
SL = Shrinkage Limit
UW= Unit Weight
W = Moisture Content
K = Permeability
O = Organic Content
D = Dispersive
RQD = Rock Quality Designation
X = X-Ray Defraction
HCpot = Hydro-Collapse Potential

*** = Average of subsamples**

SUMMARY OF RESULTS
N.D.O.T. GEOTECHNICAL SECTION

EA/Cont # **Job Description** I - 515 Soundwalls, Nellis to Mtn. Vista

Boring No. SWB - 1 **Elevation (ft)** **Station** **Date** 03/11/2008

SAMPLE NO.	SAMPLE DEPTH (ft)	SAMP-LER TYPE	N BLOWS per ft.	SOIL GROUP	W%	DRY UW pcf	% PASS #200	LL %	PL %	PI %	STRENGTH TEST					COMMENTS
											TEST TYPE	φ deg.	C psi	φ deg.	C psi	
												Peak		Residual		
A	2.5 - 4.0	SPT		SM	8.9		23.2	31	27	4						
C1	7.5 - 8.5	SPT		SM	10.1		21.6	36	29	7						
C2	8.5 - 9.0	SPT		CL	21.7		64.0	40	20	20						
D1	10.2 - 10.7	CMS		SM	9.6	101.6	38.4	33	25	8						
D2	10.7 - 11.2	CMS		CH	19.7	86.3	65.9	58	26	32	DS	32	1.39	32	1.39	
E	11.5 - 13.0	SPT		SC-SM	8.3		36.6	29	22	7						
F1	15.2 - 15.7	CMS		SC	9.3	95.8	20.5	37	22	15						
F2	15.7 - 16.2	CMS		SC	24.6	84.6	48.5	51	24	27						
G	20.0 - 21.5	SPT		CH	28.7		86.3	52	20	32						
H	25.0 - 26.5	SPT		CL	31.3		96.3	47	23	24						
BULK 1	2.0 - 5.0			SC			24.0	34	23	11						RV = 71

CMS = California Modified Sampler 2.40" ID
SPT = Standard Penetration 1.38" ID
CS = Continuous Sample 3.23" ID
RC = Rock Core
PB = Pitcher Barrel
CSS = Calif. Split Spoon 2.42" ID
CPT = Cone Penetration Test
TP = Test Pit
P = Pushed, not driven
R = Refusal
Sh = Shelby Tube 2.87" ID

U = Unconfined Compressive
UU = Unconsolidated Undrained
CD = Consolidated Drained
CU = Consolidated Undrained
DS = Direct Shear
φ = Friction
C = Cohesion
N = No. of blows per ft., sampler

N = Field SPT N = $(N_{css})(0.62)$

H = Hydrometer
S = Sieve
G = Specific Gravity
PI = Plasticity Index
LL = Liquid Limit
PL = Plastic Limit
NP = Non-Plastic
OC = Consolidation
Ch = Chemical
RV = R - Value
MD = Moisture Density

CM = Compaction
E = Swell/Pressure on Expansive Soils
SL = Shrinkage Limit
UW= Unit Weight
W = Moisture Content
K = Permeability
O = Organic Content
D = Dispersive
RQD = Rock Quality Designation
X = X-Ray Defraction
HCpot = Hydro-Collapse Potential

*** = Average of subsamples**

SUMMARY OF RESULTS
N.D.O.T. GEOTECHNICAL SECTION

EA/Cont # **Job Description** I - 515 Soundwalls, Nellis to Mtn. Vista

Boring No. SWB - 2 **Elevation (ft)** **Station** **Date** 03/11/2008

SAMPLE NO.	SAMPLE DEPTH (ft)	SAMP-LER TYPE	N BLOWS per ft.	SOIL GROUP	W%	DRY UW pcf	% PASS #200	LL %	PL %	PI %	STRENGTH TEST					COMMENTS
											TEST TYPE	φ deg.	C psi	φ deg.	C psi	
												Peak		Residual		
A	2.5 - 4.0	SPT		SM	10.0		24.7	33	27	6						
B1	5.0 - 6.0	SPT		SC	16.1		44.4	41	19	22						
B2	6.0 - 6.5	SPT		SC	10.3		45.0	33	24	9						
C1	7.7 - 8.2	CMS		SC-SM	11.1	104.2	45.1	28	21	7						
C2	8.2 - 8.7	CMS			11.2	103.1	44.4									
D	9.0 - 10.5	SPT		SC-SM	9.1		41.6	27	21	6						
E	12.5 - 14.0	SPT		SC	8.6		38.1	30	21	9						
F	17.5 - 19.0	SPT		SC	20.9		45.4	42	19	23						
G	25.0 - 26.5	SPT		CH	49.6		89.0	66	23	43						
BULK 1	2.0 - 5.0			SC			26.8	35	24	11						RV = 48

CMS = California Modified Sampler 2.40" ID
SPT = Standard Penetration 1.38" ID
CS = Continuous Sample 3.23" ID
RC = Rock Core
PB = Pitcher Barrel
CSS = Calif. Split Spoon 2.42" ID
CPT = Cone Penetration Test
TP = Test Pit
P = Pushed, not driven
R = Refusal
Sh = Shelby Tube 2.87" ID

U = Unconfined Compressive
UU = Unconsolidated Undrained
CD = Consolidated Drained
CU = Consolidated Undrained
DS = Direct Shear
φ = Friction
C = Cohesion
N = No. of blows per ft., sampler

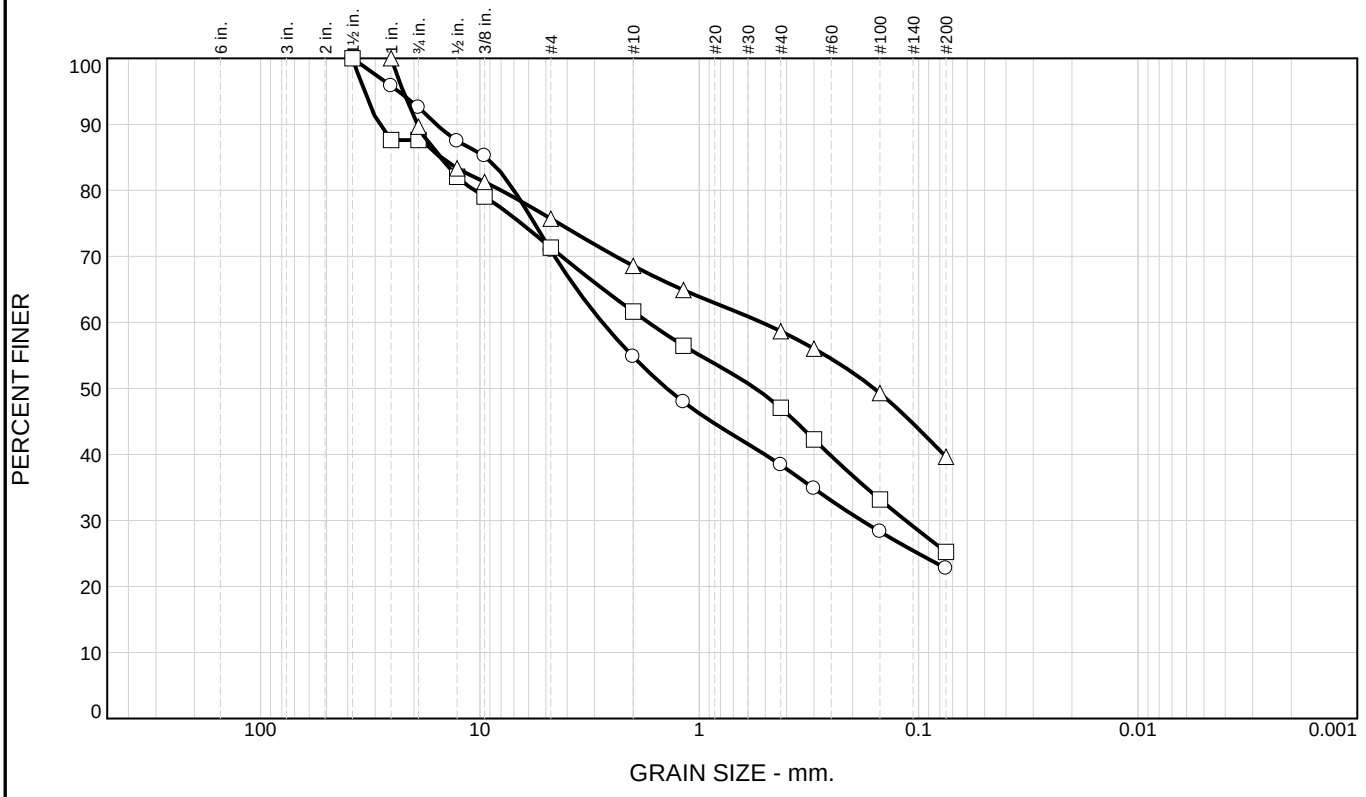
N = Field SPT N = $(N_{css})(0.62)$

H = Hydrometer
S = Sieve
G = Specific Gravity
PI = Plasticity Index
LL = Liquid Limit
PL = Plastic Limit
NP = Non-Plastic
OC = Consolidation
Ch = Chemical
RV = R - Value
MD = Moisture Density

CM = Compaction
E = Swell/Pressure on Expansive Soils
SL = Shrinkage Limit
UW= Unit Weight
W = Moisture Content
K = Permeability
O = Organic Content
D = Dispersive
RQD = Rock Quality Designation
X = X-Ray Defraction
HCpot = Hydro-Collapse Potential

*** = Average of subsamples**

Particle Size Distribution Report



	+3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS	AASHTO	PL	LL
○	0.0	29.1	48.2	22.7		SC	A-2-6(0)	24	37
□	0.0	28.7	46.1	25.2		SC	A-2-4(0)	23	33
△	0.0	24.3	36.1	39.6		SC	A-6(3)	19	38

SIEVE inches size	PERCENT FINER ○	□	△
1-1/2	100.0	100.0	
1	95.8	87.6	100.0
3/4	92.6	87.6	89.6
1/2	87.4	82.1	83.3
3/8	85.2	79.1	81.3
	GRAIN SIZE		
D_{60}	2.7662	1.7068	0.5190
D_{30}	0.1818	0.1145	
D_{10}			
	COEFFICIENTS		
C_c			
C_u			

SIEVE number size	PERCENT FINER ○	□	△
#4	70.9	71.3	75.7
#10	54.8	61.6	68.6
#16	47.9	56.5	64.9
#40	38.4	47.1	58.7
#50	34.8	42.3	56.0
#100	28.3	33.2	49.3
#200	22.7	25.2	39.6

Material Description
○ clayey sand with gravel
□ clayey sand with gravel
△ clayey sand with gravel

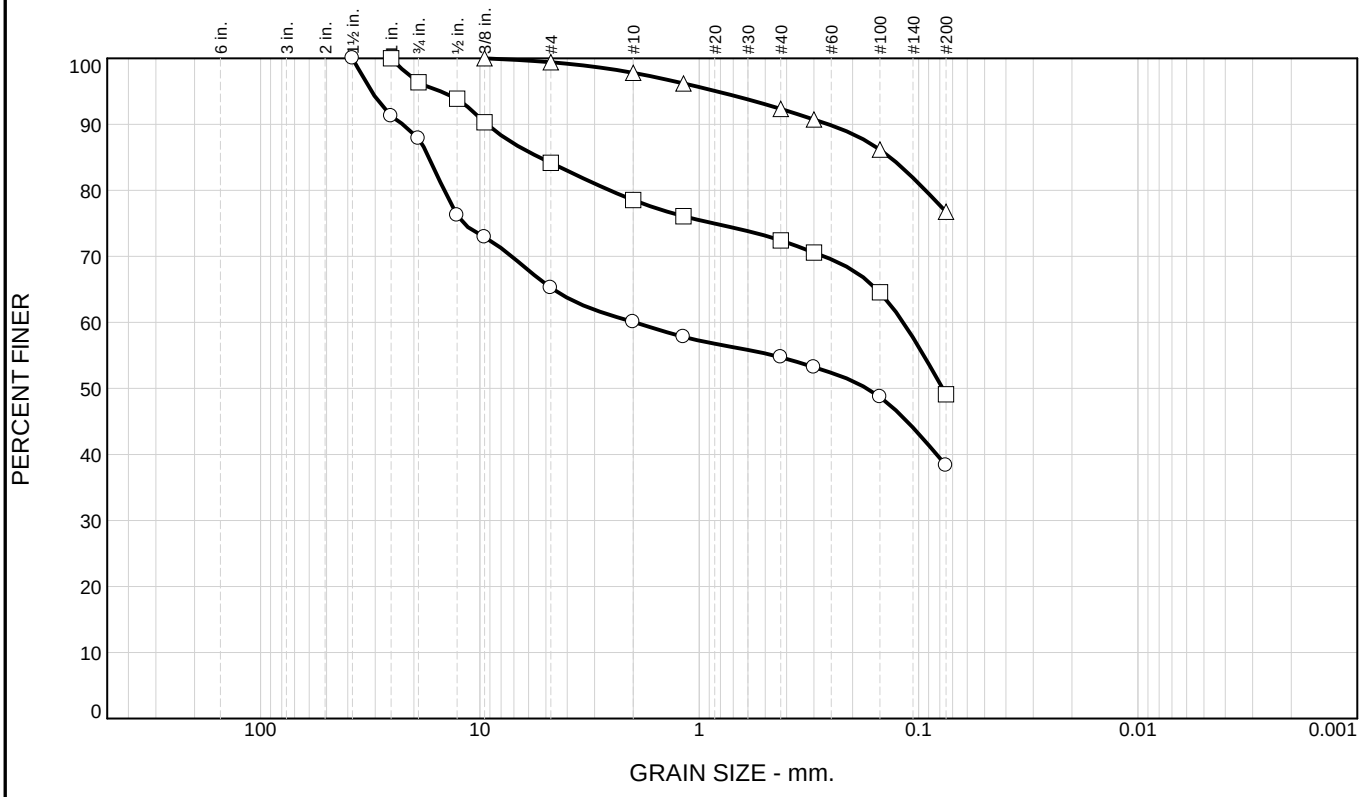
REMARKS:
○
□
△

○ Source of Sample: SWA-1 Depth: 3.0 - 5.0' Sample Number: BULK 1
□ Source of Sample: SWA-1 Depth: 3.0 - 4.5' Sample Number: A
△ Source of Sample: SWA-1 Depth: 5.0 - 6.5' Sample Number: B

NEVADA DEPARTMENT OF TRANSPORTATION

Client: A. Ablahani
Project: I-515 Soundwalls, Nellis to Mtn. Vista
Project No.: FL-1-08
Figure

Particle Size Distribution Report



	+3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS	AASHTO	PL	LL
○	0.0	34.8	26.9	38.3		GC	A-7-6(4)	17	43
□	0.0	15.8	35.1	49.1		SM	A-7-6(5)	27	44
△	0.0	0.6	22.6	76.8		CL	A-6(13)	16	35

SIEVE inches size	PERCENT FINER ○	□	△
1-1/2	100.0		
1	91.3	100.0	
3/4	87.9	96.4	
1/2	76.2	93.9	
3/8	72.9	90.3	100.0
GRAIN SIZE			
D_{60}	1.9684	0.1175	
D_{30}			
D_{10}			
COEFFICIENTS			
C_c			
C_u			

SIEVE number size	PERCENT FINER ○	□	△
#4	65.2	84.2	99.4
#10	60.1	78.5	97.8
#16	57.8	76.1	96.2
#40	54.7	72.4	92.3
#50	53.2	70.6	90.7
#100	48.7	64.6	86.2
#200	38.3	49.1	76.8

Material Description
○ clayey gravel with sand

□ silty sand with gravel

△ lean clay with sand

REMARKS:
○

□

△

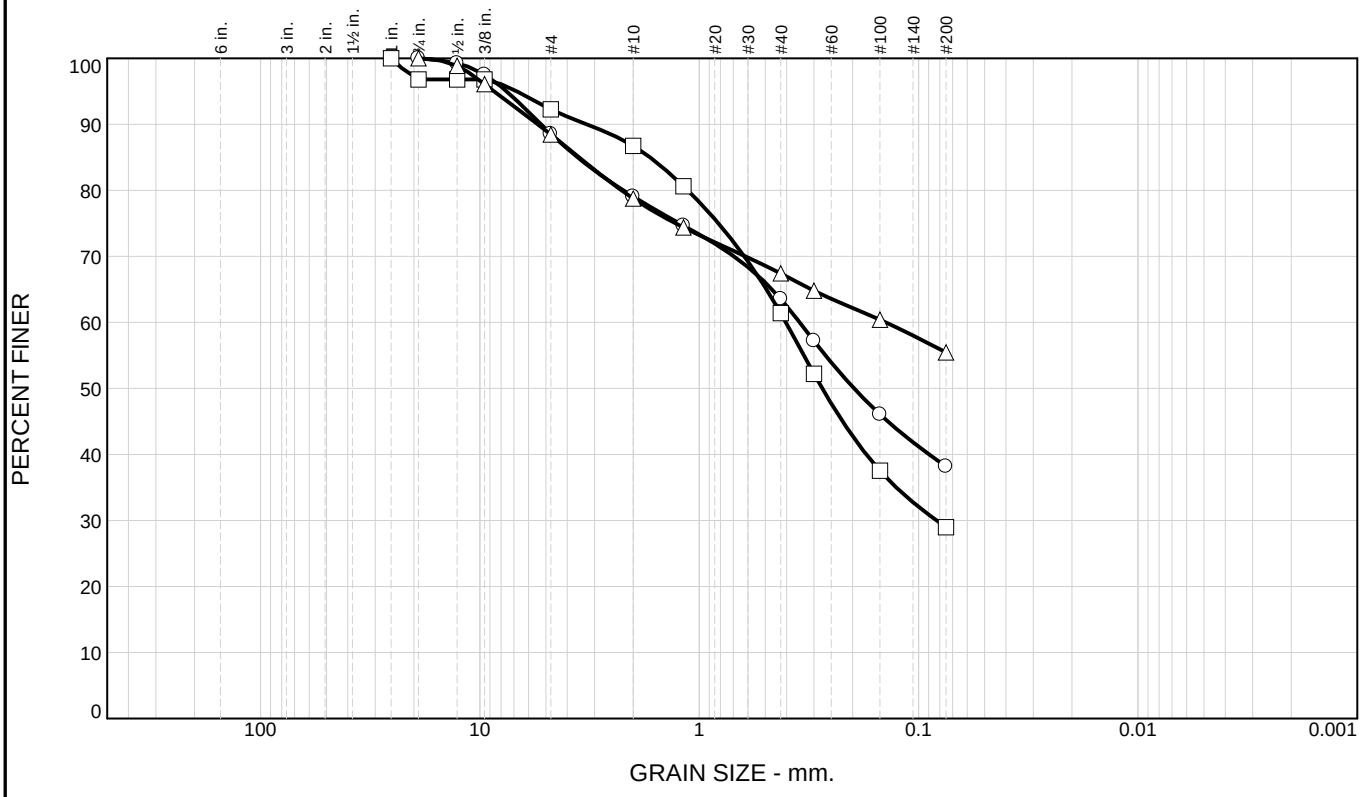
○ Source of Sample: SWA-1 Depth: 7.7 - 8.2' Sample Number: C1
□ Source of Sample: SWA-1 Depth: 8.2 - 8.7' Sample Number: C2
△ Source of Sample: SWA-1 Depth: 9.0 - 10.0' Sample Number: D

NEVADA DEPARTMENT OF TRANSPORTATION

Client: A. Ablahani
Project: I-515 Soundwalls, Nellis to Mtn. Vista
Project No.: FL-1-08

Figure

Particle Size Distribution Report



	+3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS	AASHTO	PL	LL
○	0.0	11.4	50.4	38.2		SC	A-7-6(6)	17	49
□	0.0	7.7	63.3	29.0		SC	A-2-6(1)	18	33
△	0.0	11.5	33.0	55.5		CL	A-6(7)	19	36

SIEVE inches size	PERCENT FINER ○	□	△
1		100.0	
3/4	100.0	96.8	100.0
1/2	99.2	96.8	98.9
3/8	97.5	96.8	96.1
	GRAIN SIZE		
D_{60}	0.3485	0.4024	0.1409
D_{30}		0.0827	
D_{10}			
	COEFFICIENTS		
C_c			
C_u			

SIEVE number size	PERCENT FINER ○	□	△
#4	88.6	92.3	88.5
#10	79.0	86.7	78.8
#16	74.7	80.6	74.4
#40	63.6	61.4	67.4
#50	57.2	52.2	64.8
#100	46.1	37.5	60.4
#200	38.2	29.0	55.5

Material Description
○ clayey sand
□ clayey sand
△ sandy lean clay

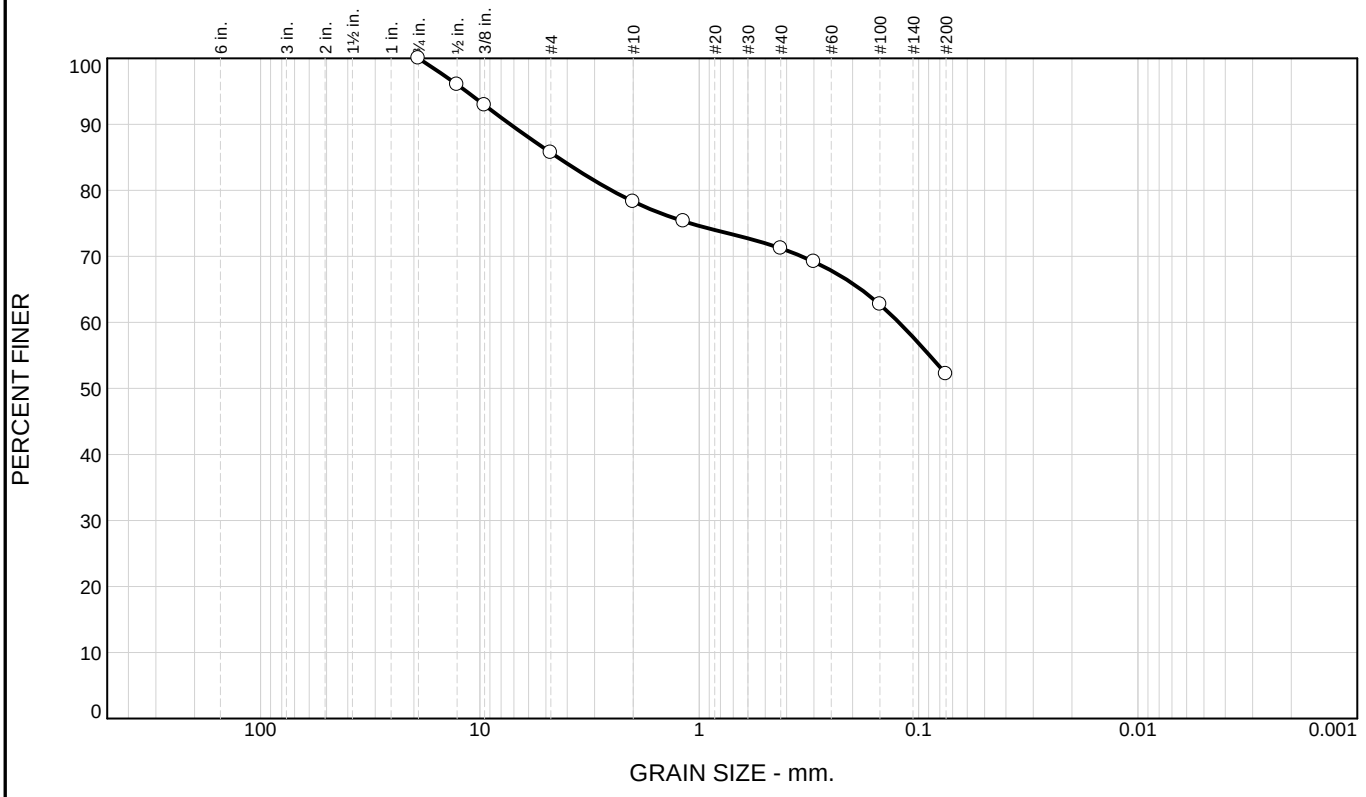
REMARKS:
○
□
△

○ Source of Sample: SWA-1 Depth: 10.0 - 11.4' Sample Number: E
□ Source of Sample: SWA-1 Depth: 12.5 - 13.4' Sample Number: F
△ Source of Sample: SWA-1 Depth: 17.5 - 19.0' Sample Number: G

NEVADA DEPARTMENT OF TRANSPORTATION

Client: A. Ablahani
Project: I-515 Soundwalls, Nellis to Mtn. Vista
Project No.: FL-1-08
Figure

Particle Size Distribution Report



	+3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS	AASHTO	PL	LL
○	0.0	14.3	33.5	52.2		CL	A-6(4)	19	33

SIEVE inches size	PERCENT FINER ○		
3/4	100.0		
1/2	96.0		
3/8	92.9		
	GRAIN SIZE		
D_{60}	0.1228		
D_{30}			
D_{10}			
	COEFFICIENTS		
C_c			
C_u			

SIEVE number size	PERCENT FINER ○		
#4	85.7		
#10	78.3		
#16	75.3		
#40	71.2		
#50	69.2		
#100	62.7		
#200	52.2		

Material Description
○ sandy lean clay

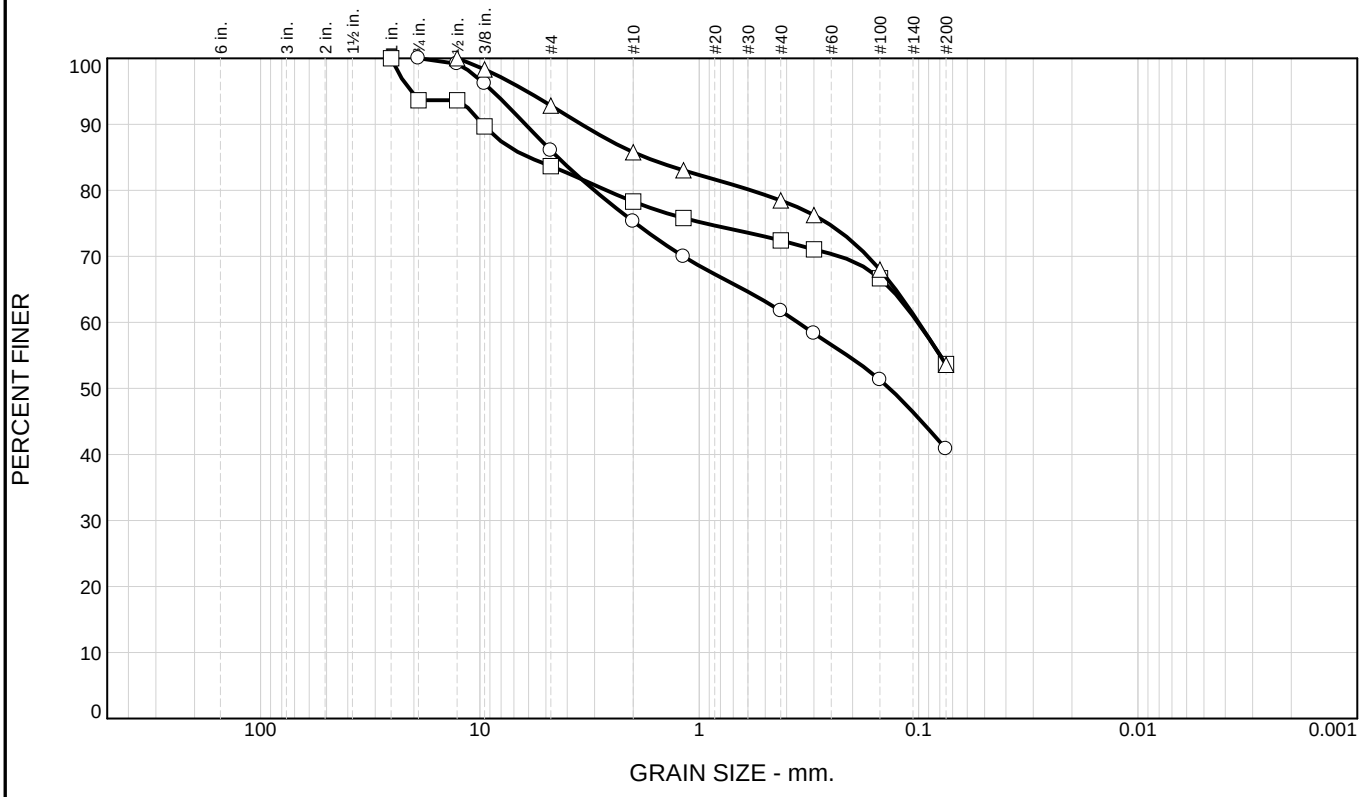
REMARKS:
○

○ Source of Sample: SWA-1 Depth: 22.5 - 24.0' Sample Number: H

NEVADA DEPARTMENT OF TRANSPORTATION

Client: A. Ablahani
Project: I-515 Soundwalls, Nellis to Mtn. Vista
Project No.: FL-1-08 Figure

Particle Size Distribution Report



	+3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS	AASHTO	PL	LL
○	0.0	14.0	45.2	40.8		SC	A-6(4)	16	37
□	0.0	16.3	30.0	53.7		CL	A-7-6(11)	16	44
△	0.0	7.2	39.2	53.6		CL	A-7-6(13)	17	48

SIEVE inches size	PERCENT FINER ○	□	△
1		100.0	
3/4	100.0	93.6	
1/2	99.2	93.6	100.0
3/8	96.2	89.7	98.3
	GRAIN SIZE		
D_{60}	0.3551	0.1008	0.0999
D_{30}			
D_{10}			
	COEFFICIENTS		
C_c			
C_u			

SIEVE number size	PERCENT FINER ○	□	△
#4	86.0	83.7	92.8
#10	75.3	78.3	85.8
#16	70.0	75.8	83.0
#40	61.7	72.4	78.5
#50	58.3	71.1	76.3
#100	51.3	66.7	68.0
#200	40.8	53.7	53.6

Material Description
○ clayey sand
□ sandy lean clay with gravel
△ sandy lean clay

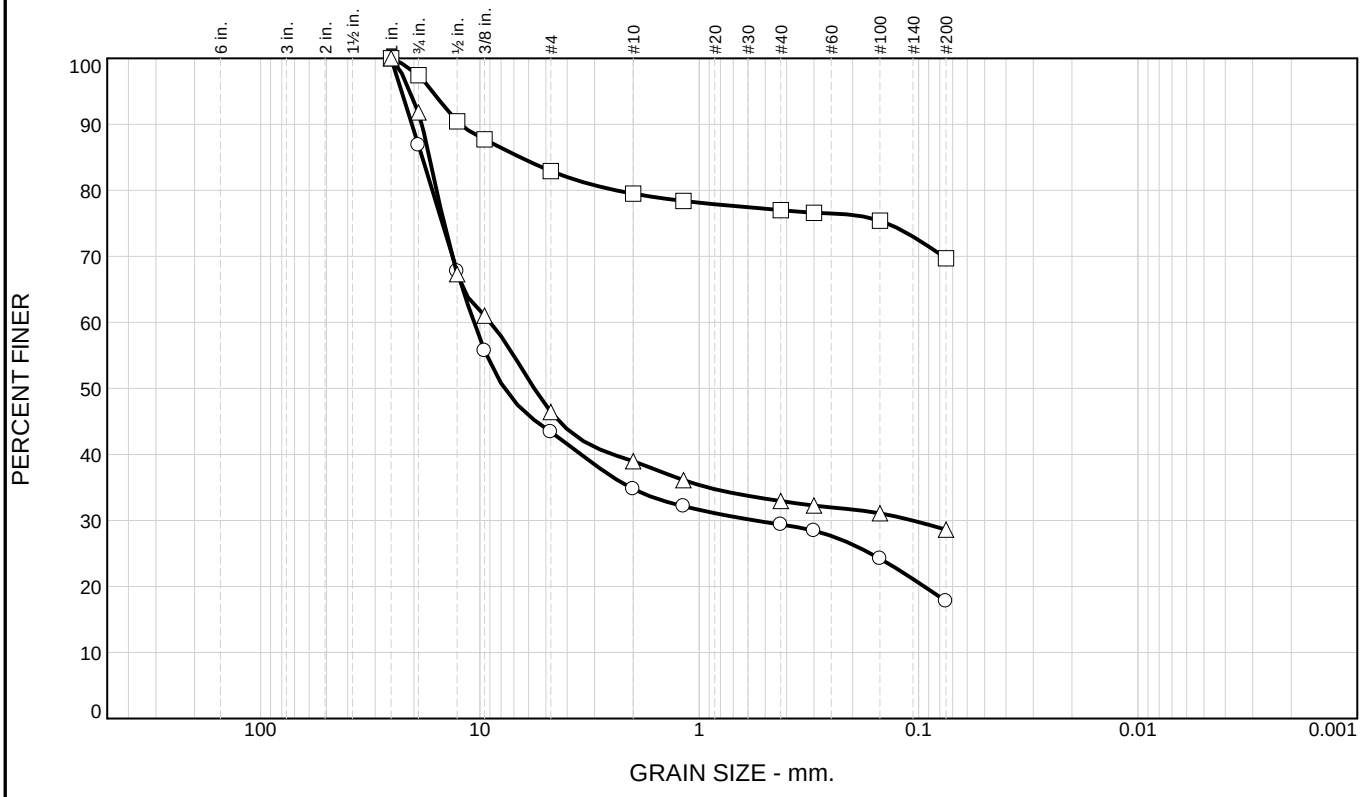
REMARKS:
○
□
△

○ Source of Sample: SWA-2 Depth: 3.0 - 5.0' Sample Number: BULK 1
□ Source of Sample: SWA-2 Depth: 3.0 - 4.5' Sample Number: A
△ Source of Sample: SWA-2 Depth: 5.0 - 6.0' Sample Number: B1

NEVADA DEPARTMENT OF TRANSPORTATION

Client: A. Ablahani
Project: I-515 Soundwalls, Nellis to Mtn. Vista
Project No.: FL-1-08 Figure

Particle Size Distribution Report



	+3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS	AASHTO	PL	LL
○	0.0	56.6	25.6	17.8					
□	0.0	17.1	13.2	69.7		CL	A-7-6(18)	18	46
△	0.0	53.6	17.8	28.6		GC	A-2-7(3)	19	48

SIEVE inches size	PERCENT FINER ○	□	△
1	100.0	100.0	100.0
3/4	86.9	97.4	91.8
1/2	67.8	90.4	67.3
3/8	55.7	87.7	61.0
	GRAIN SIZE		
D_{60}	10.6632		8.9358
D_{30}	0.5571		0.1065
D_{10}			
	COEFFICIENTS		
C_c			
C_u			

SIEVE number size	PERCENT FINER ○	□	△
#4	43.4	82.9	46.4
#10	34.8	79.5	39.0
#16	32.2	78.4	36.1
#40	29.4	77.0	33.0
#50	28.5	76.6	32.3
#100	24.2	75.4	31.1
#200	17.8	69.7	28.6

Material Description

○

□gravelly lean clay

△clayey gravel with sand

REMARKS:

○

□

△

○ Source of Sample: SWA-2 Depth: 6.0 - 6.5' Sample Number: B2

□ Source of Sample: SWA-2 Depth: 7.2 - 7.7' Sample Number: C1

△ Source of Sample: SWA-2 Depth: 7.7 - 8.2' Sample Number: C2

NEVADA DEPARTMENT OF TRANSPORTATION

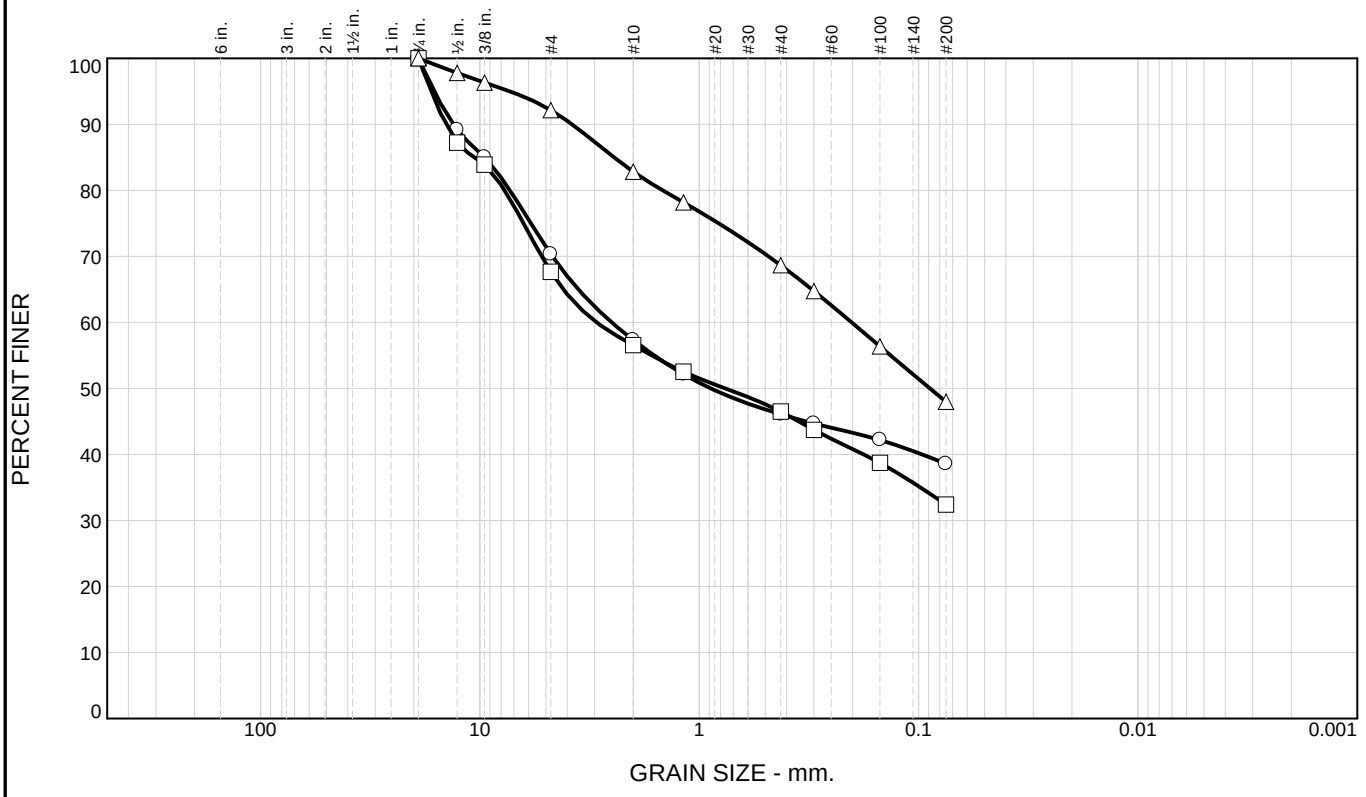
Client: A. Ablahani

Project: I-515 Soundwalls, Nellis to Mtn. Vista

Project No.: FL-1-08

Figure

Particle Size Distribution Report



	+3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS	AASHTO	PL	LL
○	0.0	29.7	31.7	38.6		SC	A-6(4)	18	40
□	0.0	32.3	35.3	32.4		SC	A-2-6(1)	18	35
△	0.0	7.8	44.2	48.0		SC	A-6(5)	19	37

SIEVE inches size	PERCENT FINER ○	□	△
3/4	100.0	100.0	100.0
1/2	89.2	87.2	97.8
3/8	85.0	83.9	96.3
GRAIN SIZE			
D_{60}	2.5083	2.9392	0.2019
D_{30}			
D_{10}			
COEFFICIENTS			
C_c			
C_u			

SIEVE number size	PERCENT FINER ○	□	△
#4	70.3	67.7	92.2
#10	57.3	56.6	82.8
#16	52.1	52.5	78.2
#40	46.1	46.5	68.7
#50	44.7	43.7	64.7
#100	42.2	38.7	56.4
#200	38.6	32.4	48.0

Material Description
○ clayey sand with gravel
□ clayey sand with gravel
△ clayey sand

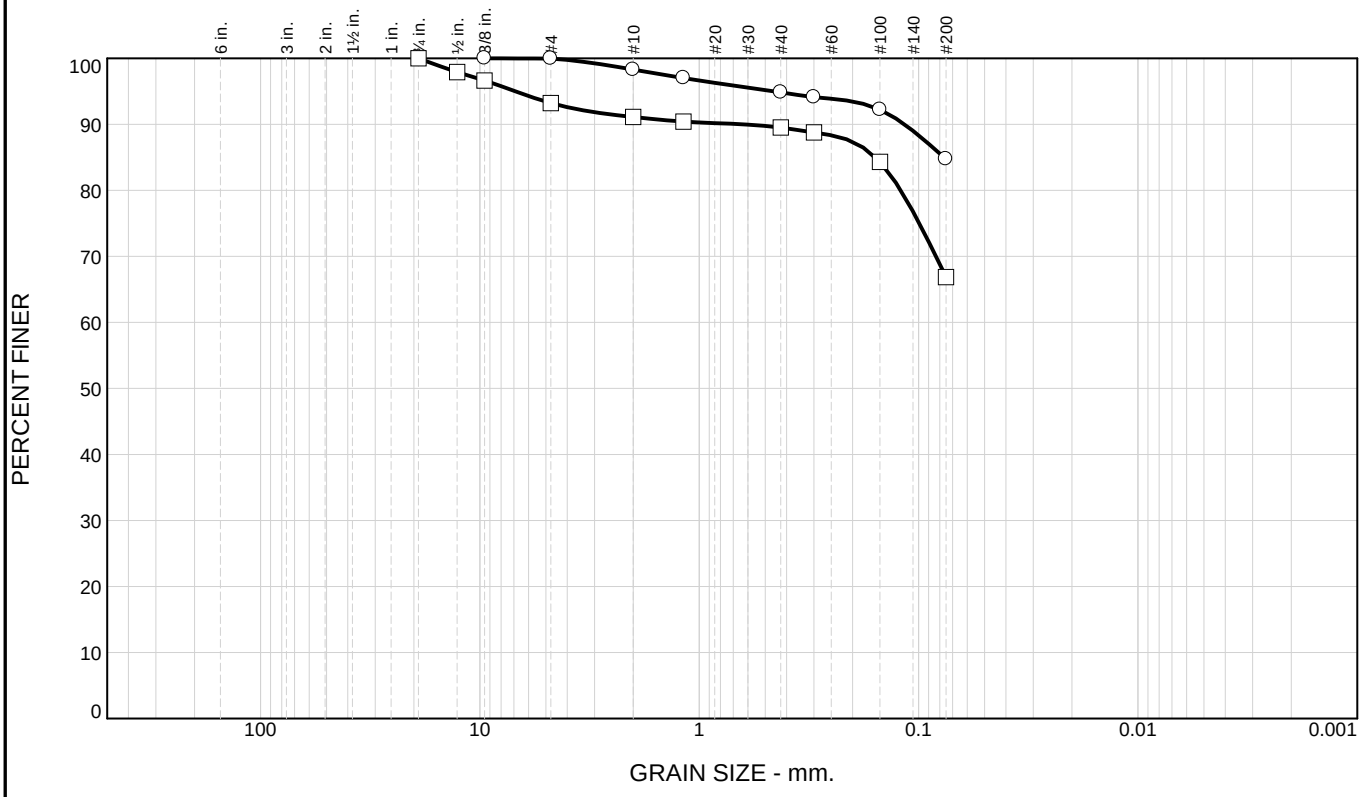
REMARKS:
○
□
△

○ Source of Sample: SWA-2 Depth: 8.5 - 9.5' Sample Number: D
□ Source of Sample: SWA-2 Depth: 10.0 - 10.5' Sample Number: E
△ Source of Sample: SWA-2 Depth: 14.0 - 15.5 Sample Number: F

NEVADA DEPARTMENT OF TRANSPORTATION

Client: A. Ablahani
Project: I-515 Soundwalls, Nellis to Mtn. Vista
Project No.: FL-1-08
Figure

Particle Size Distribution Report



	+3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS	AASHTO	PL	LL
○	0.0	0.0	15.3	84.7		CL	A-6(17)	19	39
□	0.0	6.8	26.3	66.9		CL	A-4(5)	21	31

SIEVE inches size	○	□
3/4		100.0
1/2		97.9
3/8	100.0	96.6
GRAIN SIZE		
D_{60}		
D_{30}		
D_{10}		
COEFFICIENTS		
C_c		
C_u		

SIEVE number size	○	□
#4	100.0	93.2
#10	98.3	91.1
#16	97.0	90.4
#40	94.8	89.5
#50	94.1	88.8
#100	92.2	84.3
#200	84.7	66.9

Material Description
○ lean clay

□ sandy lean clay

REMARKS:
○

□

○ Source of Sample: SWA-2 Depth: 19.0 - 20.5' Sample Number: G

□ Source of Sample: SWA-2 Depth: 24.0 - 25.5' Sample Number: H

NEVADA DEPARTMENT OF TRANSPORTATION

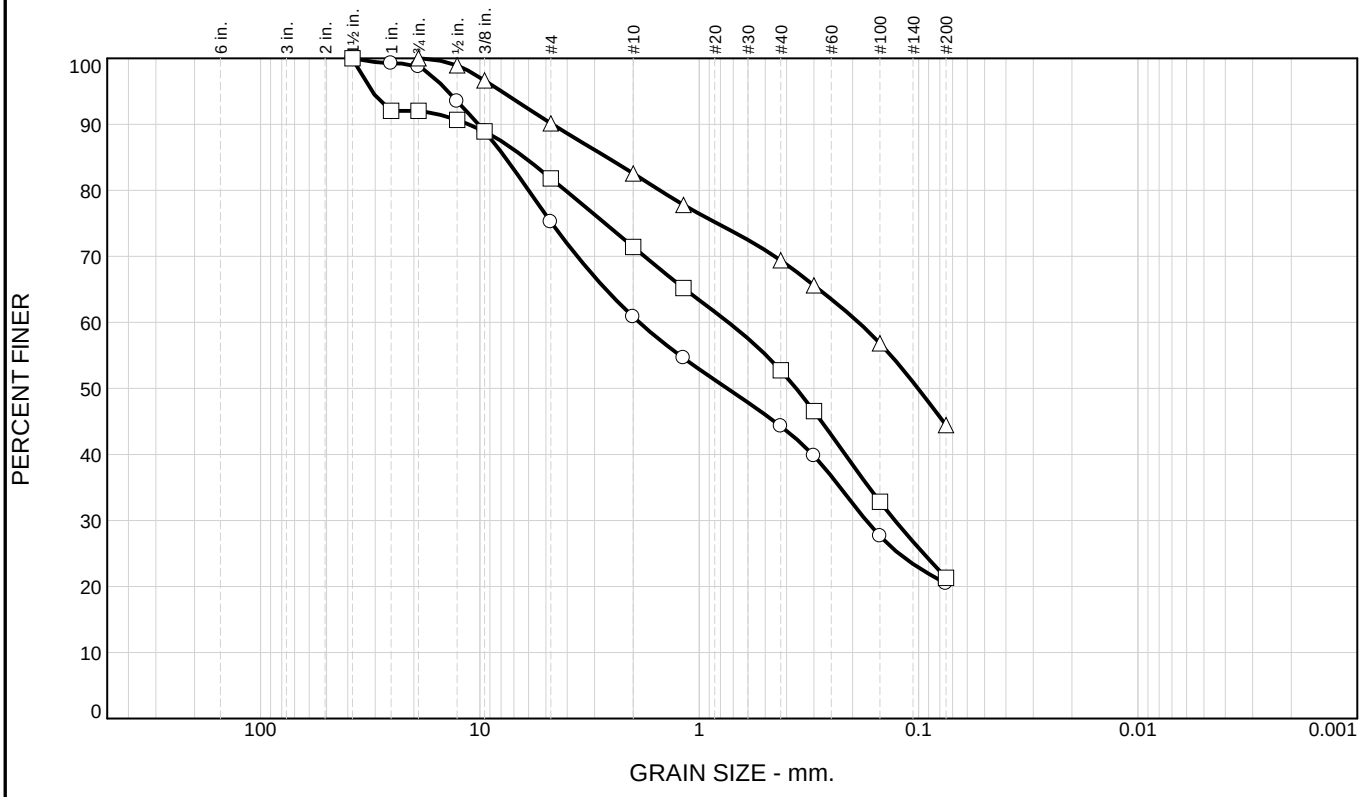
Client: A. Ablahani

Project: I-515 Soundwalls, Nellis to Mtn. Vista

Project No.: FL-1-08

Figure

Particle Size Distribution Report



	+3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS	AASHTO	PL	LL
○	0.0	24.8	54.8	20.4		SC	A-2-4(0)	23	32
□	0.0	18.2	60.5	21.3		SM	A-2-4(0)	NP	
△	0.0	9.8	45.8	44.4		SC-SM	A-4(0)	19	26

SIEVE inches size	PERCENT FINER ○	□	△
1-1/2	100.0	100.0	
1	99.2	92.0	
3/4	98.7	92.0	100.0
1/2	93.5	90.7	98.9
3/8	89.0	88.9	96.7
	GRAIN SIZE		
D_{60}	1.8772	0.7356	0.1876
D_{30}	0.1734	0.1282	
D_{10}			
	COEFFICIENTS		
C_c			
C_u			

SIEVE number size	PERCENT FINER ○	□	△
#4	75.2	81.8	90.2
#10	60.8	71.4	82.6
#16	54.6	65.2	77.8
#40	44.3	52.7	69.4
#50	39.8	46.6	65.6
#100	27.6	32.8	56.8
#200	20.4	21.3	44.4

Material Description
○ clayey sand with gravel
□ silty sand with gravel
△ silty, clayey sand

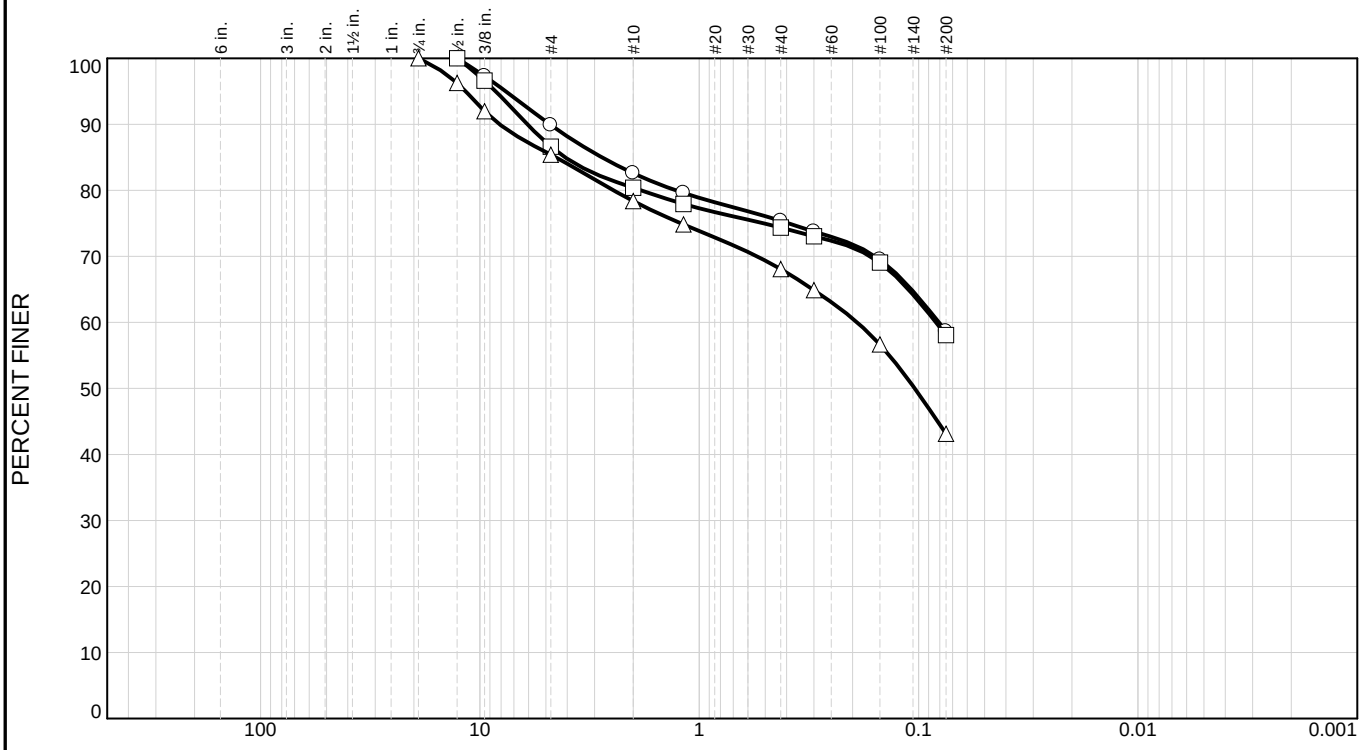
REMARKS:
○
□
△

○ Source of Sample: SWA-3 Depth: 3.0 - 5.0' Sample Number: BULK 1
□ Source of Sample: SWA-3 Depth: 2.5 - 4.0' Sample Number: A
△ Source of Sample: SWA-3 Depth: 5.0 - 6.2' Sample Number: B1

NEVADA DEPARTMENT OF TRANSPORTATION

Client: A. Ablahani
Project: I-515 Soundwalls, Nellis to Mtn. Vista
Project No.: FL-1-08
Figure

Particle Size Distribution Report



	+3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS	AASHTO	PL	LL
○	0.0	10.1	31.2	58.7		CL	A-7-6(13)	18	46
□	0.0	13.4	28.5	58.1		CL	A-7-6(12)	15	42
△	0.0	14.6	42.3	43.1		SC	A-6(3)	22	36

SIEVE inches size	PERCENT FINER ○	□	△
3/4			100.0
1/2	100.0	100.0	96.3
3/8	97.3	96.6	92.0
	GRAIN SIZE		
D_{60}	0.0807	0.0833	0.1903
D_{30}			
D_{10}			
	COEFFICIENTS		
C_c			
C_u			

SIEVE number size	PERCENT FINER ○	□	△
#4	89.9	86.6	85.4
#10	82.6	80.4	78.4
#16	79.6	77.9	74.8
#40	75.4	74.4	68.1
#50	73.8	73.0	64.9
#100	69.5	69.1	56.7
#200	58.7	58.1	43.1

Material Description
○ sandy lean clay

□ sandy lean clay

△ clayey sand

REMARKS:
○

□

△

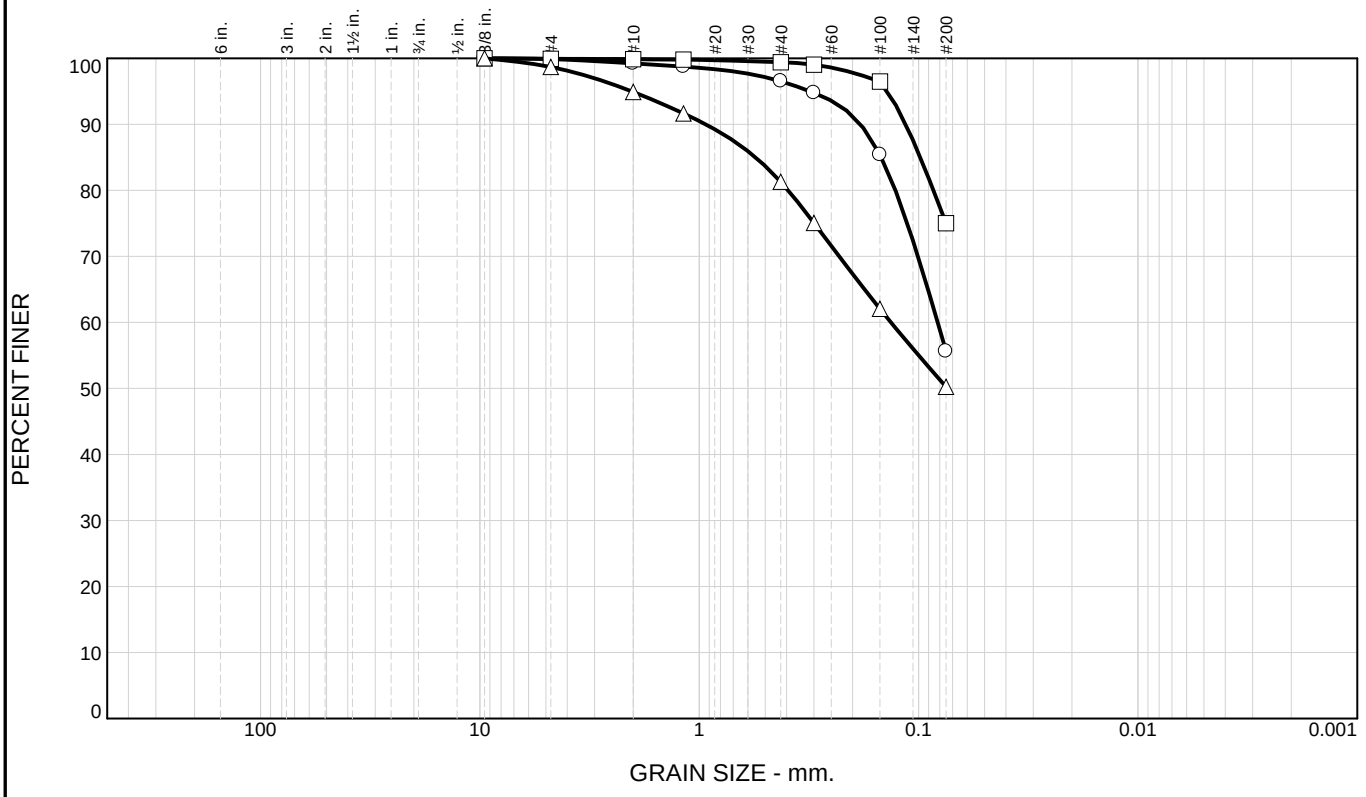
○ Source of Sample: SWA-3 Depth: 8.2 - 8.7' Sample Number: C1
□ Source of Sample: SWA-3 Depth: 8.7 - 9.2' Sample Number: C2
△ Source of Sample: SWA-3 Depth: 9.5 - 11.0' Sample Number: D

NEVADA DEPARTMENT OF TRANSPORTATION

Client: A. Ablahani
Project: I-515 Soundwalls, Nellis to Mtn. Vista
Project No.: FL-1-08

Figure

Particle Size Distribution Report



	+3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS	AASHTO	PL	LL
○	0.0	0.1	44.3	55.6		CL-ML	A-4(0)	22	26
□	0.0	0.1	24.9	75.0		CL	A-6(6)	18	29
△	0.0	1.3	48.5	50.2		CL	A-4(2)	20	30

SIEVE inches size	PERCENT FINER ○	□	△
3/8	100.0	100.0	100.0
GRAIN SIZE			
D_{60}	0.0818		0.1336
D_{30}			
D_{10}			
COEFFICIENTS			
C_c			
C_u			

SIEVE number size	PERCENT FINER ○	□	△
#4	99.9	99.9	98.7
#10	99.2	99.9	94.9
#16	98.7	99.8	91.6
#40	96.5	99.4	81.3
#50	94.8	99.0	75.1
#100	85.4	96.5	62.1
#200	55.6	75.0	50.2

Material Description
○ sandy silty clay
□ lean clay with sand
△ sandy lean clay

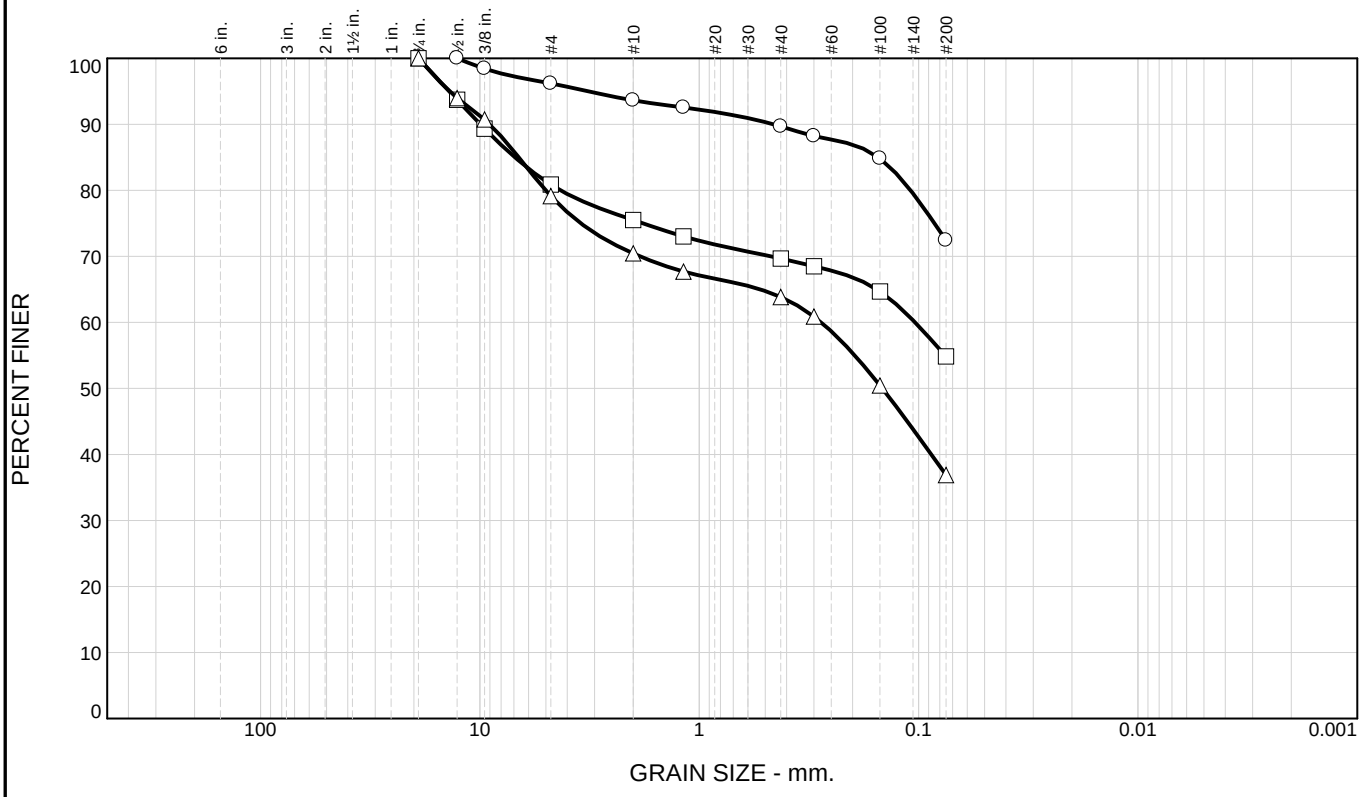
REMARKS:
○
□
△

○ Source of Sample: SWA-3 Depth: 12.7 - 13.2' Sample Number: E1
□ Source of Sample: SWA-3 Depth: 13.2 - 13.7' Sample Number: E2
△ Source of Sample: SWA-3 Depth: 14.0 - 15.5' Sample Number: F

NEVADA DEPARTMENT OF TRANSPORTATION

Client: A. Ablahani
Project: I-515 Soundwalls, Nellis to Mtn. Vista
Project No.: FL-1-08
Figure

Particle Size Distribution Report



	+3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS	AASHTO	PL	LL
○	0.0	3.8	23.8	72.4		CL	A-6(15)	16	39
□	0.0	19.1	26.1	54.8		CL	A-7-6(12)	18	46
△	0.0	20.9	42.2	36.9		SC-SM	A-4(0)	18	25

SIEVE inches size	PERCENT FINER ○	□	△
3/4		100.0	100.0
1/2	100.0	93.7	94.0
3/8	98.4	89.4	90.7
GRAIN SIZE			
D_{60}		0.1037	0.2777
D_{30}			
D_{10}			
COEFFICIENTS			
C_c			
C_u			

SIEVE number size	PERCENT FINER ○	□	△
#4	96.2	80.9	79.1
#10	93.6	75.5	70.5
#16	92.6	73.0	67.7
#40	89.7	69.7	63.8
#50	88.2	68.5	60.9
#100	84.8	64.7	50.4
#200	72.4	54.8	36.9

Material Description
○ lean clay with sand

□ sandy lean clay with gravel

△ silty, clayey sand with gravel

REMARKS:
○

□

△

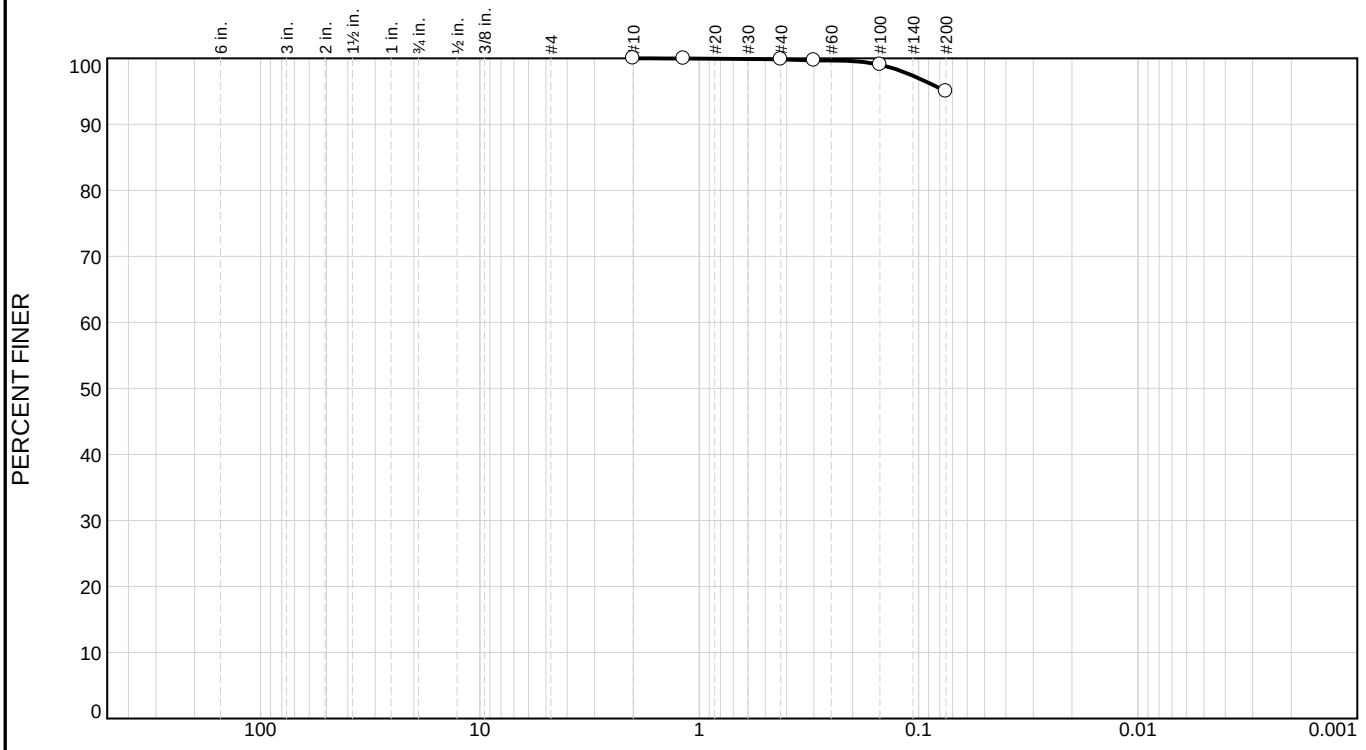
○ Source of Sample: SWA-3 Depth: 17.7 - 18.2' Sample Number: G1
□ Source of Sample: SWA-3 Depth: 18.2 - 18.7' Sample Number: G2
△ Source of Sample: SWA-3 Depth: 19.0 - 20.0' Sample Number: H

NEVADA DEPARTMENT OF TRANSPORTATION

Client: A. Ablahani
Project: I-515 Soundwalls, Nellis to Mtn. Vista
Project No.: FL-1-08

Figure

Particle Size Distribution Report



	+3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS	AASHTO	PL	LL
○	0.0	0.0	5.0	95.0		CL	A-7-6(31)	19	49

SIEVE inches size	PERCENT FINER ○		
GRAIN SIZE			
D_{60}			
D_{30}			
D_{10}			
COEFFICIENTS			
C_c			
C_u			

SIEVE number size	PERCENT FINER ○		
#10	100.0		
#16	100.0		
#40	99.8		
#50	99.7		
#100	99.0		
#200	95.0		

Material Description
○ lean clay

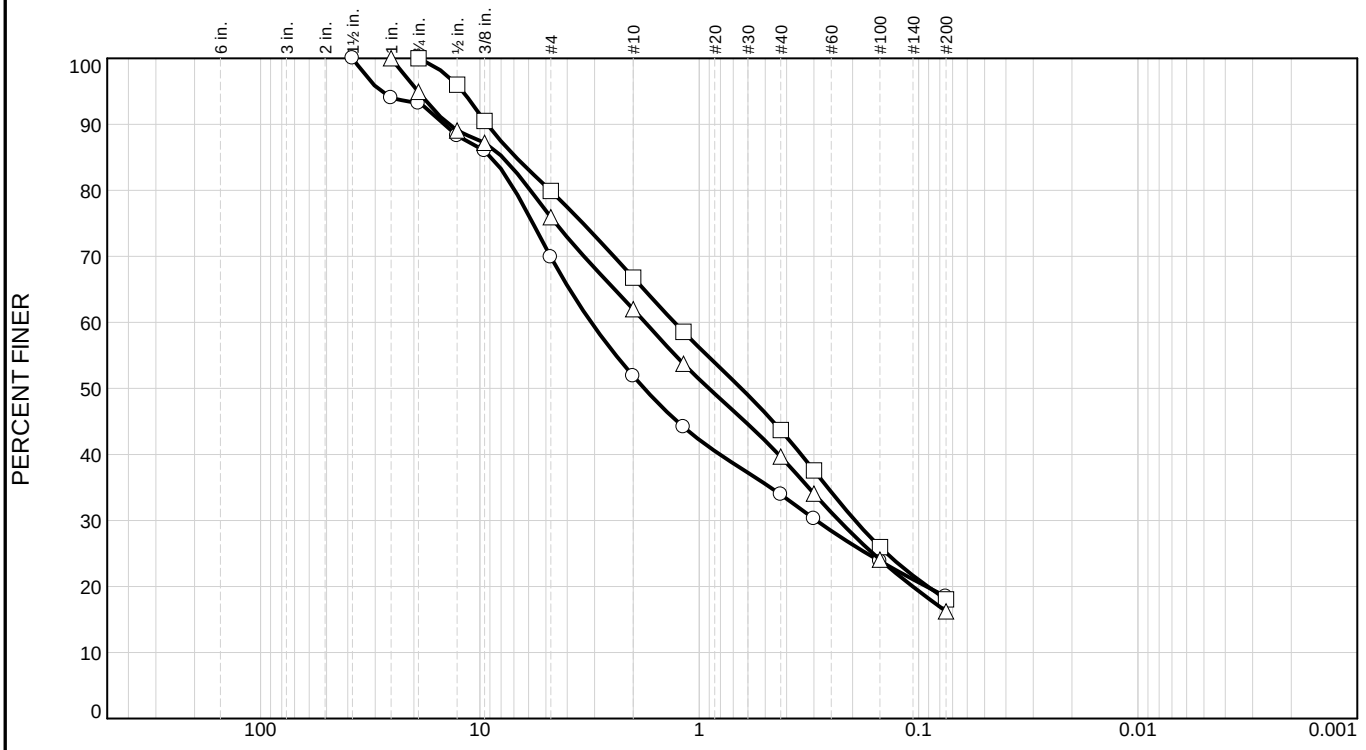
REMARKS:
○

○ Source of Sample: SWA-3 Depth: 25.0 - 26.0' Sample Number: I

NEVADA DEPARTMENT OF TRANSPORTATION

Client: A. Ablahani
Project: I-515 Soundwalls, Nellis to Mtn. Vista
Project No.: FL-1-08 Figure

Particle Size Distribution Report



	+3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS	AASHTO	PL	LL
○	0.0	30.1	51.4	18.5		SC	A-2-4(0)	21	29
□	0.0	20.1	61.9	18.0		SC	A-2-4(0)	23	32
△	0.0	24.1	59.7	16.2		SM	A-2-4(0)	25	34

SIEVE inches size	PERCENT FINER ○	□	△
1-1/2	100.0		
1	94.0		100.0
3/4	93.2	100.0	94.9
1/2	88.3	96.0	89.1
3/8	86.0	90.5	87.2
	GRAIN SIZE		
D_{60}	3.1088	1.2979	1.7638
D_{30}	0.2927	0.1948	0.2308
D_{10}			
	COEFFICIENTS		
C_c			
C_u			

SIEVE number size	PERCENT FINER ○	□	△
#4	69.9	79.9	75.9
#10	51.9	66.8	62.0
#16	44.2	58.6	53.7
#40	33.9	43.7	39.7
#50	30.3	37.6	34.1
#100	23.8	26.0	24.1
#200	18.5	18.0	16.2

Material Description
○ clayey sand with gravel
□ clayey sand with gravel
△ silty sand with gravel

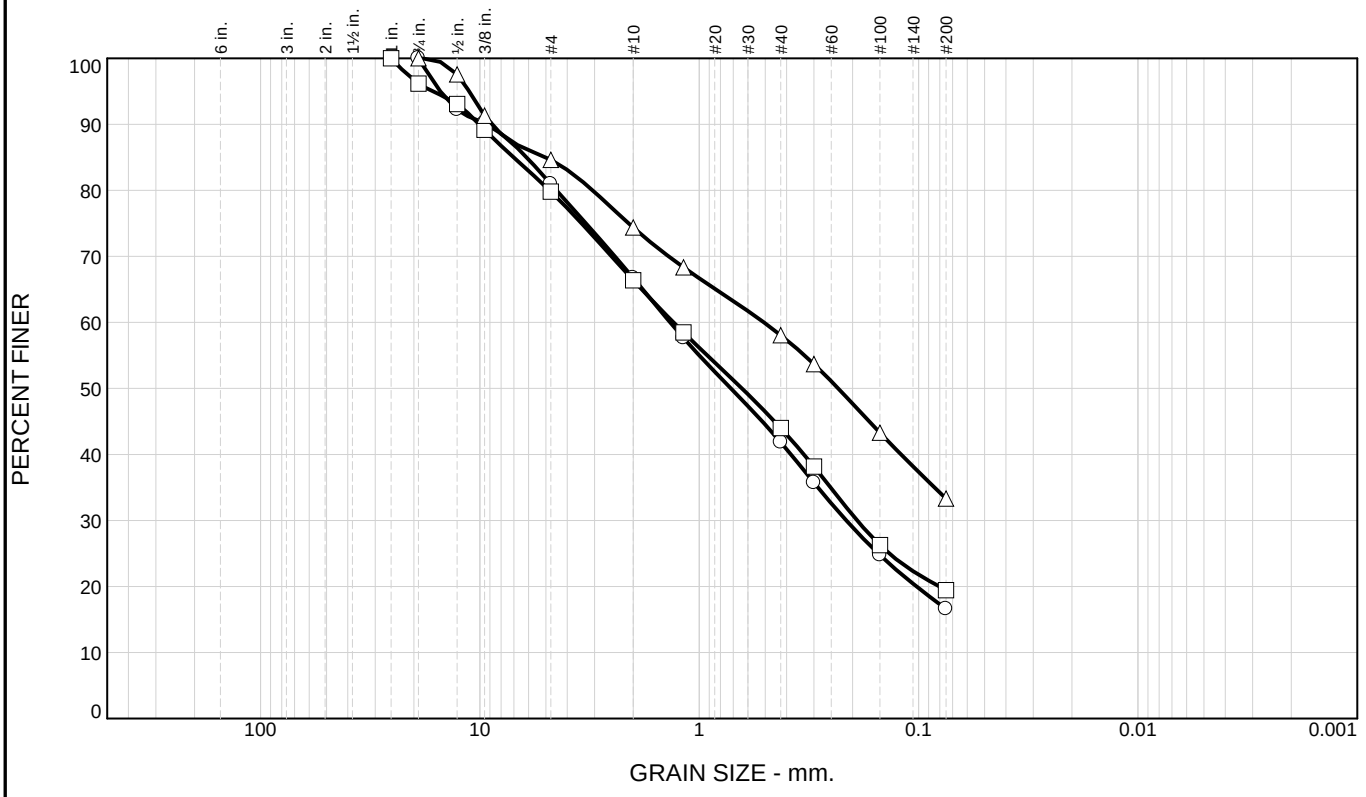
REMARKS:
○
□
△

○ Source of Sample: SWA-4 Depth: 3.0 - 5.0' Sample Number: BULK 1
□ Source of Sample: SWA-4 Depth: 2.5 - 4.0' Sample Number: A
△ Source of Sample: SWA-4 Depth: 4.0 - 5.5' Sample Number: B

NEVADA DEPARTMENT OF TRANSPORTATION

Client: A. Ablahani
Project: I-515 Soundwalls, Nellis to Mtn. Vista
Project No.: FL-1-08
Figure

Particle Size Distribution Report



	+3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS	AASHTO	PL	LL
○	0.0	19.0	64.4	16.6		SC-SM	A-2-4(0)	22	29
□	0.0	20.2	60.4	19.4		SC	A-2-4(0)	22	30
△	0.0	15.4	51.3	33.3		SC	A-2-6(0)	21	32

SIEVE inches size	PERCENT FINER ○	□	△
1		100.0	
3/4	100.0	96.2	100.0
1/2	92.2	93.1	97.6
3/8	90.2	89.2	91.3
GRAIN SIZE			
D_{60}	1.3584	1.3115	0.5072
D_{30}	0.2136	0.1905	
D_{10}			
COEFFICIENTS			
C_c			
C_u			

SIEVE number size	PERCENT FINER ○	□	△
#4	81.0	79.8	84.6
#10	66.7	66.4	74.4
#16	57.6	58.5	68.3
#40	41.9	44.0	58.1
#50	35.7	38.2	53.7
#100	24.8	26.3	43.3
#200	16.6	19.4	33.3

Material Description

○ silty, clayey sand with gravel

□ clayey sand with gravel

△ clayey sand with gravel

REMARKS:

○

□

△

○ Source of Sample: SWA-4 Depth: 7.5 - 9.0' Sample Number: C

□ Source of Sample: SWA-4 Depth: 10.0 - 11.5' Sample Number: D

△ Source of Sample: SWA-4 Depth: 12.0 - 13.5' Sample Number: E

NEVADA DEPARTMENT OF TRANSPORTATION

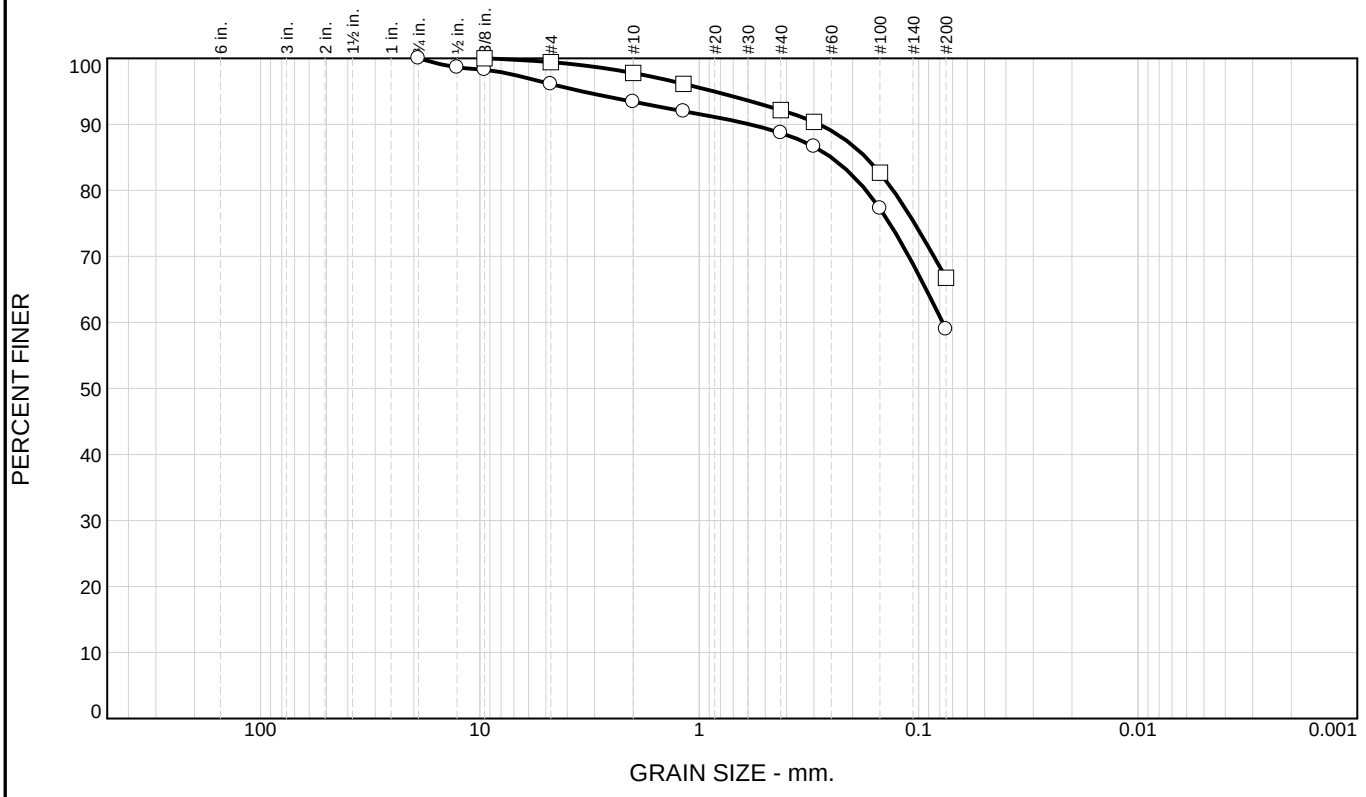
Client: A. Ablahani

Project: I-515 Soundwalls, Nellis to Mtn. Vista

Project No.: FL-1-08

Figure

Particle Size Distribution Report



	+3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS	AASHTO	PL	LL
○	0.0	3.9	37.1	59.0		CL	A-6(4)	18	29
□	0.0	0.6	32.6	66.8		CL	A-4(5)	20	30

SIEVE inches size	PERCENT FINER ○	PERCENT FINER □
3/4	100.0	
1/2	98.6	
3/8	98.3	100.0
GRAIN SIZE		
D_{60}	0.0777	
D_{30}		
D_{10}		
COEFFICIENTS		
C_c		
C_u		

SIEVE number size	PERCENT FINER ○	PERCENT FINER □
#4	96.1	99.4
#10	93.4	97.8
#16	92.0	96.1
#40	88.7	92.2
#50	86.6	90.4
#100	77.3	82.7
#200	59.0	66.8

Material Description
○ sandy lean clay

□ sandy lean clay

REMARKS:
○

□

○ Source of Sample: SWA-4 Depth: 17.0 - 18.5' Sample Number: F

□ Source of Sample: SWA-4 Depth: 22.0 - 23.5' Sample Number: G

NEVADA DEPARTMENT OF TRANSPORTATION

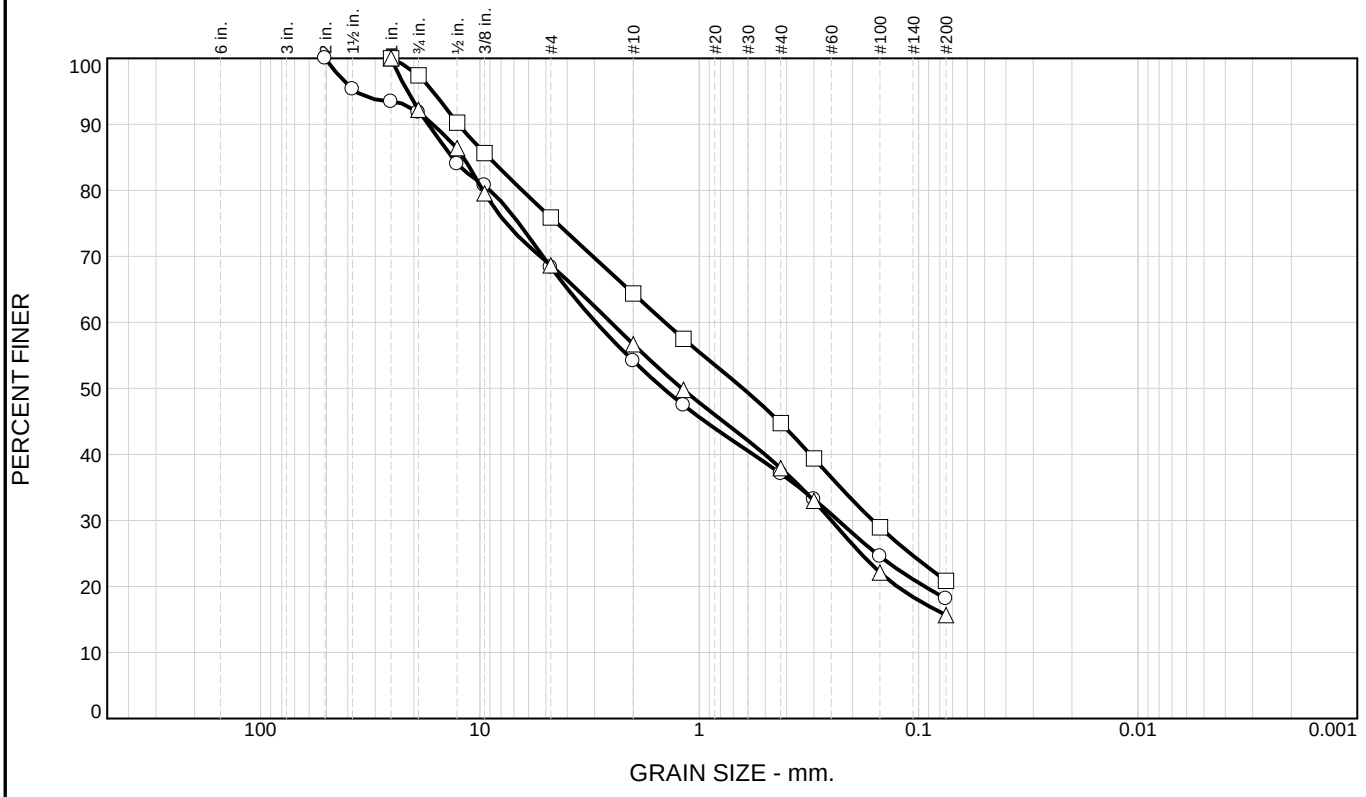
Client: A. Ablahani

Project: I-515 Soundwalls, Nellis to Mtn. Vista

Project No.: FL-1-08

Figure

Particle Size Distribution Report



	+3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS	AASHTO	PL	LL
○	0.0	31.6	50.3	18.1		SC	A-2-4(0)	20	28
□	0.0	24.1	55.0	20.9		SM	A-1-b	23	26
△	0.0	31.4	52.9	15.7		SM	A-1-b	25	28

SIEVE inches size	PERCENT FINER ○	□	△
2	100.0		
1-1/2	95.3		
1	93.5	100.0	100.0
3/4	91.8	97.4	92.2
1/2	84.0	90.2	86.4
3/8	80.7	85.6	79.5
	GRAIN SIZE		
D_{60}	2.9586	1.4349	2.5299
D_{30}	0.2324	0.1618	0.2496
D_{10}			
	COEFFICIENTS		
C_c			
C_u			

SIEVE number size	PERCENT FINER ○	□	△
#4	68.4	75.9	68.6
#10	54.2	64.4	56.7
#16	47.5	57.5	49.8
#40	37.1	44.7	37.9
#50	33.2	39.4	33.0
#100	24.6	29.0	22.1
#200	18.1	20.9	15.7

Material Description
○ clayey sand with gravel
□ silty sand with gravel
△ silty sand with gravel

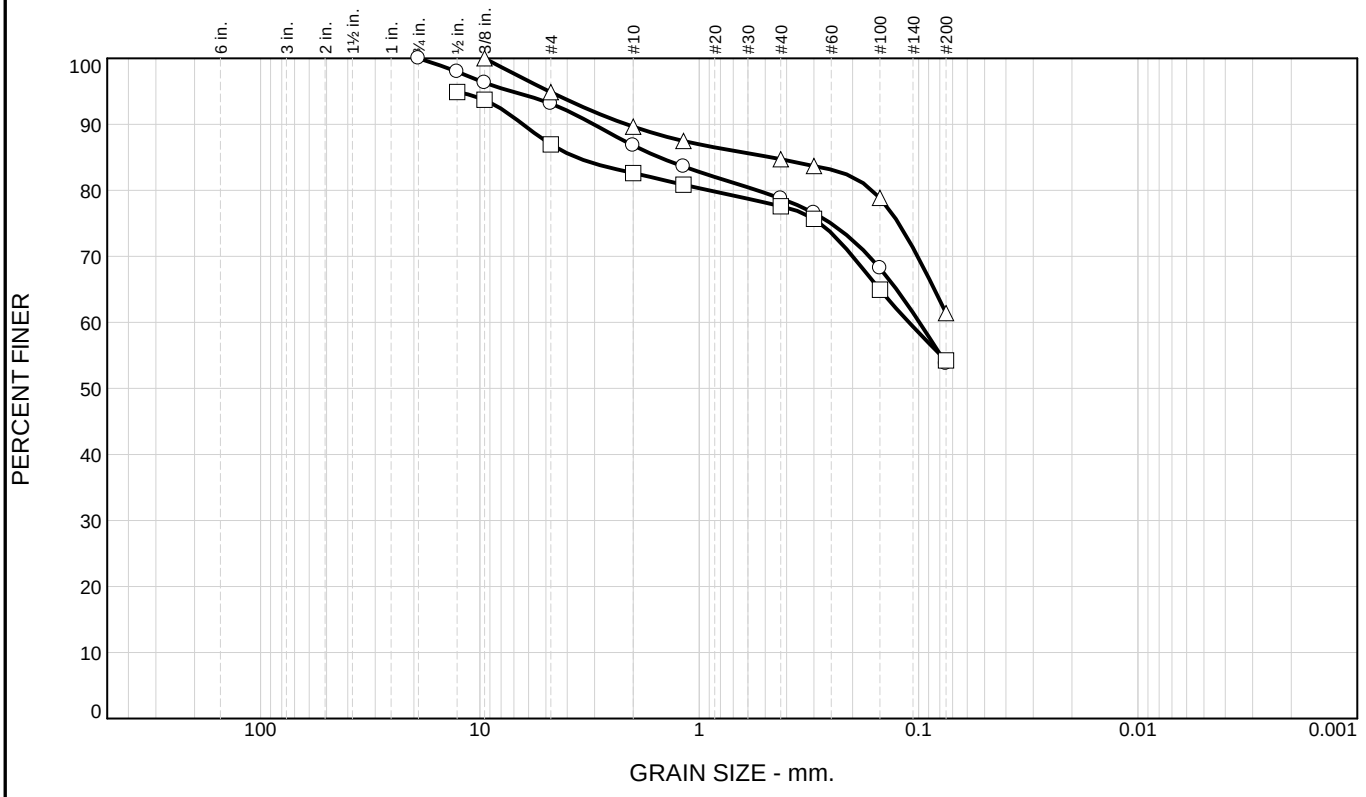
REMARKS:
○
□
△

○ Source of Sample: SWA-5 Depth: 3.0 - 5.0' Sample Number: BULK 1
□ Source of Sample: SWA-5 Depth: 2.5 - 4.0' Sample Number: A
△ Source of Sample: SWA-5 Depth: 5.0 - 6.5' Sample Number: B

NEVADA DEPARTMENT OF TRANSPORTATION

Client: A. Ablahani
Project: I-515 Soundwalls, Nellis to Mtn. Vista
Project No.: FL-1-08
Figure

Particle Size Distribution Report



	+3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS	AASHTO	PL	LL
○	0.0	6.9	39.3	53.8		CL	A-4(2)	21	29
□			32.8	54.2		CL	A-6(8)	17	38
△	0.0	5.1	33.5	61.4		CL	A-6(11)	15	38

SIEVE inches size	PERCENT FINER ○	□	△
3/4	100.0		
1/2	98.0	94.9	
3/8	96.3	93.7	100.0
	GRAIN SIZE		
D_{60}	0.0990	0.1106	
D_{30}			
D_{10}			
	COEFFICIENTS		
C_c			
C_u			

SIEVE number size	PERCENT FINER ○	□	△
#4	93.1	87.0	94.9
#10	86.8	82.6	89.7
#16	83.6	80.9	87.5
#40	78.8	77.6	84.7
#50	76.6	75.7	83.7
#100	68.2	65.0	78.9
#200	53.8	54.2	61.4

Material Description
○ sandy lean clay

□ sandy lean clay

△ sandy lean clay

REMARKS:
○

□

△

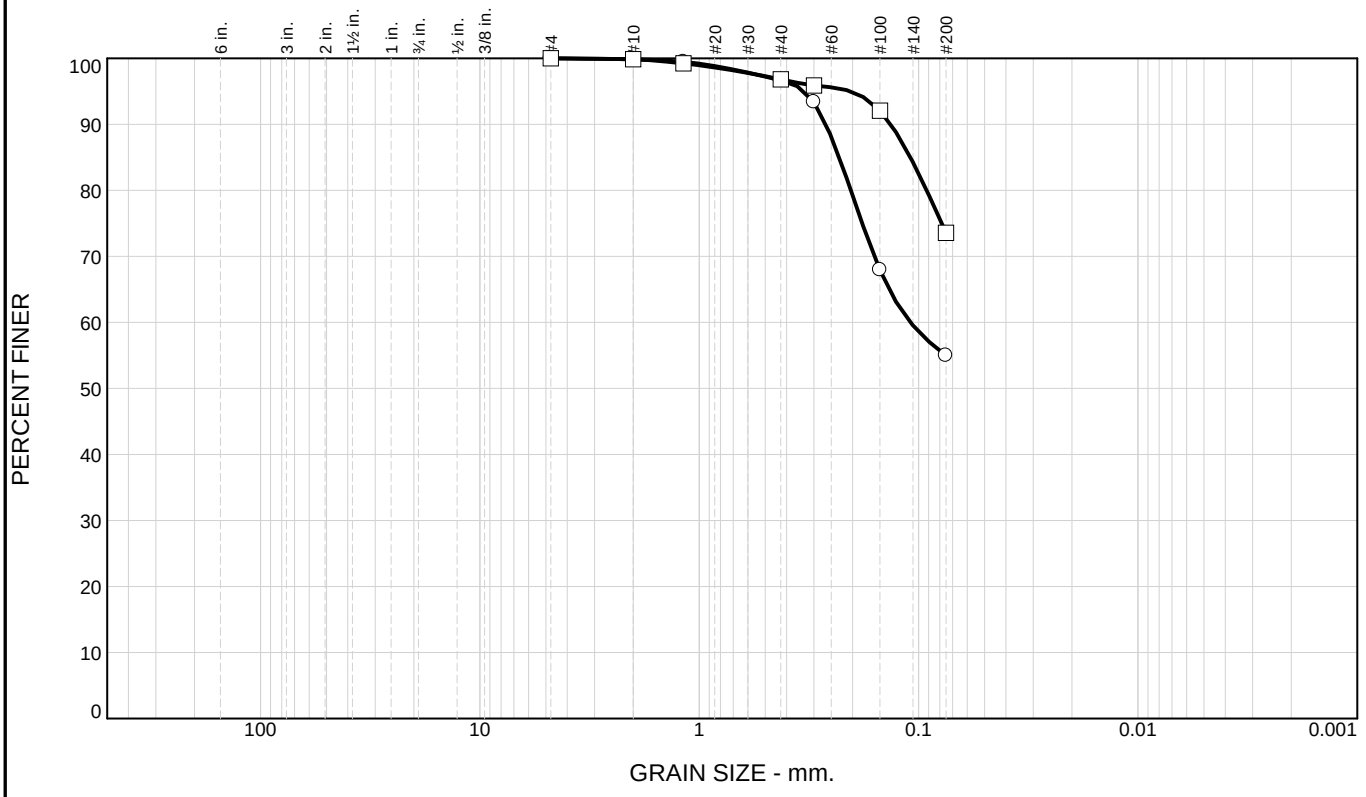
○ Source of Sample: SWA-5 Depth: 7.5 - 9.0' Sample Number: C
□ Source of Sample: SWA-5 Depth: 10.0 - 11.5' Sample Number: D
△ Source of Sample: SWA-5 Depth: 12.5 - 14.0' Sample Number: E

NEVADA DEPARTMENT OF TRANSPORTATION

Client: A. Ablahani
Project: I-515 Soundwalls, Nellis to Mtn. Vista
Project No.: FL-1-08

Figure

Particle Size Distribution Report



	+3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS	AASHTO	PL	LL
○	0.0	0.0	45.0	55.0		ML	A-4(0)	21	24
□	0.0	0.0	26.4	73.6		CL	A-4(4)	17	25

SIEVE inches size	○	□
GRAIN SIZE		
D_{60}	0.1090	
D_{30}		
D_{10}		
COEFFICIENTS		
C_c		
C_u		

SIEVE number size	○	□
#4	100.0	100.0
#10	99.8	99.9
#16	99.5	99.2
#40	96.7	96.8
#50	93.4	95.9
#100	67.9	92.1
#200	55.0	73.6

Material Description
○ sandy silt

□ lean clay with sand

REMARKS:
○

□

○ Source of Sample: SWA-5 Depth: 17.5 - 19.0' Sample Number: F

□ Source of Sample: SWA-5 Depth: 22.5 - 24.0' Sample Number: G

NEVADA DEPARTMENT OF TRANSPORTATION

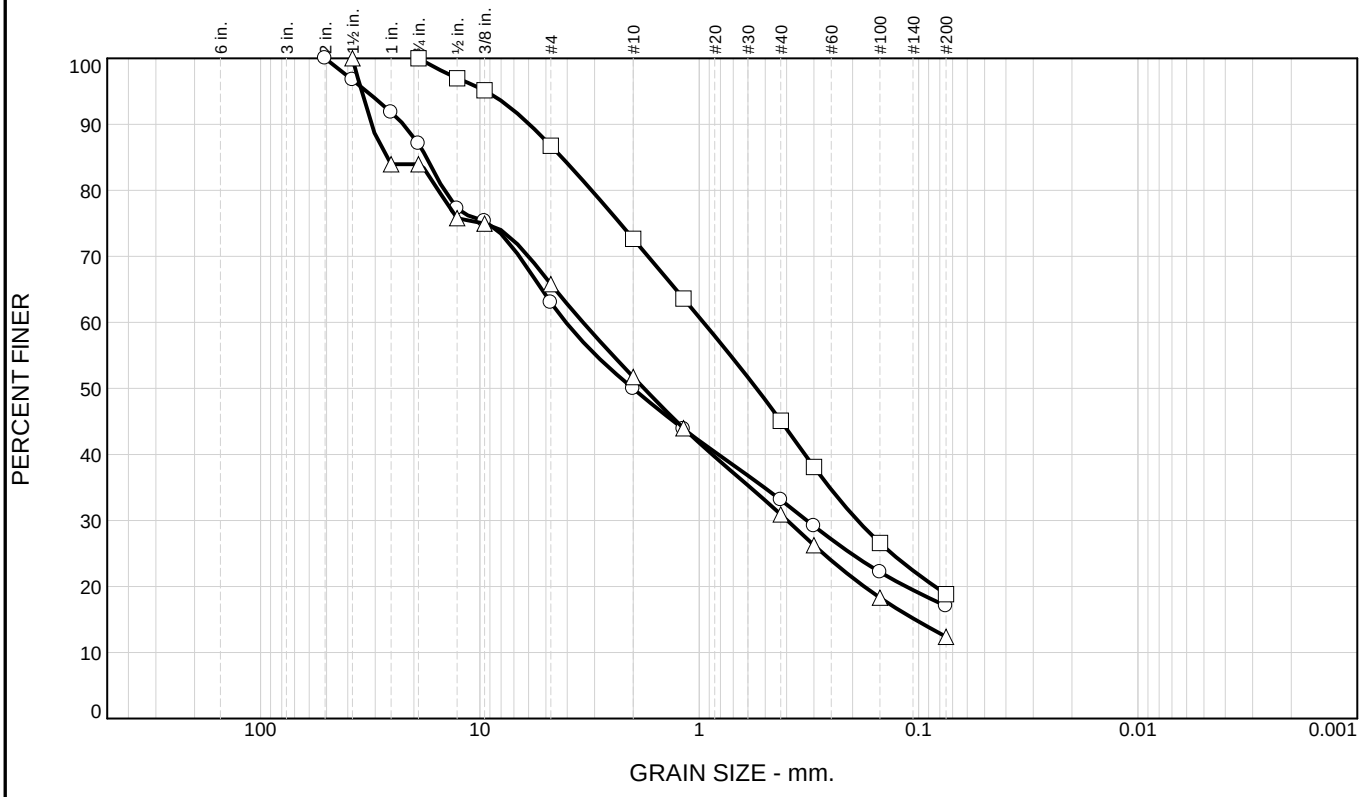
Client: A. Ablahani

Project: I-515 Soundwalls, Nellis to Mtn. Vista

Project No.: FL-1-08

Figure

Particle Size Distribution Report



	+3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS	AASHTO	PL	LL
○	0.0	37.0	46.0	17.0		SC-SM	A-2-4(0)	20	27
□	0.0	13.2	68.0	18.8		SM	A-1-b	26	30
△	0.0	34.2	53.4	12.4		SC-SM	A-1-b	19	24

SIEVE inches size	PERCENT FINER ○	□	△
2	100.0		
1-1/2	96.7		100.0
1	91.8		84.0
3/4	87.1	100.0	84.0
1/2	77.2	97.0	75.8
3/8	75.3	95.2	75.0
	GRAIN SIZE		
D_{60}	4.0547	0.9568	3.3880
D_{30}	0.3233	0.1895	0.3967
D_{10}			
	COEFFICIENTS		
C_c			
C_u			

SIEVE number size	PERCENT FINER ○	□	△
#4	63.0	86.8	65.8
#10	50.0	72.7	51.7
#16	43.8	63.6	44.0
#40	33.1	45.1	30.9
#50	29.1	38.1	26.3
#100	22.2	26.6	18.3
#200	17.0	18.8	12.4

Material Description
○ silty, clayey sand with gravel
□ silty sand
△ silty, clayey sand with gravel

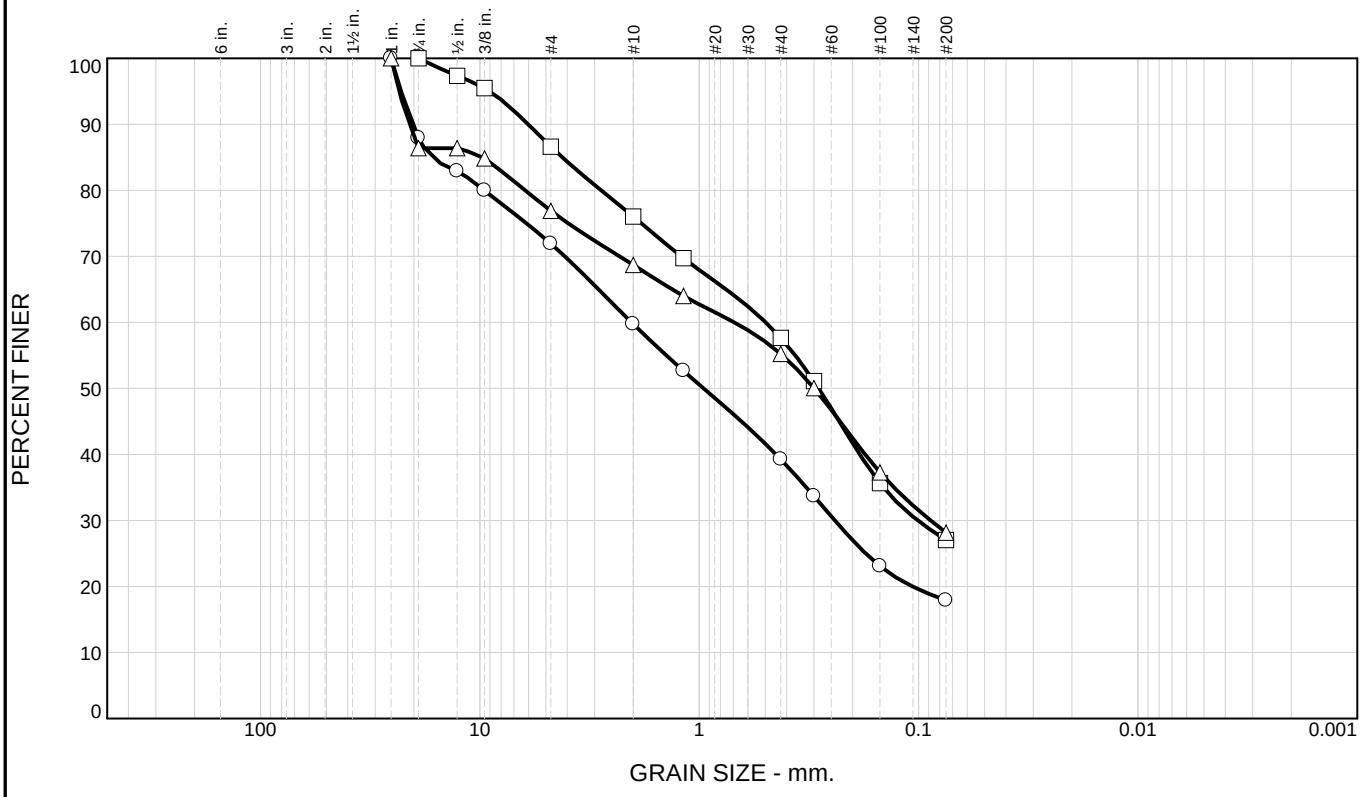
REMARKS:
○
□
△

○ Source of Sample: SWA-6 Depth: 2.5 - 5.0' Sample Number: BULK 1
□ Source of Sample: SWA-6 Depth: 2.5 - 2.9' Sample Number: A
△ Source of Sample: SWA-6 Depth: 5.0 - 6.5' Sample Number: B

NEVADA DEPARTMENT OF TRANSPORTATION

Client: A. Ablahani
Project: I-515 Soundwalls, Nellis to Mtn. Vista
Project No.: FL-1-08
Figure

Particle Size Distribution Report



	+3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS	AASHTO	PL	LL
○	0.0	28.1	54.0	17.9		SC	A-2-4(0)	21	30
□	0.0	13.4	59.6	27.0					
△	0.0	23.1	48.8	28.1		SM	A-2-6(0)	27	40

SIEVE inches size	PERCENT FINER ○	□	△
1	100.0		100.0
3/4	88.0	100.0	86.4
1/2	82.9	97.3	86.4
3/8	80.0	95.5	84.8
	GRAIN SIZE		
D_{60}	2.0361	0.4974	0.6916
D_{30}	0.2408	0.1008	0.0880
D_{10}			
	COEFFICIENTS		
C_c			
C_u			

SIEVE number size	PERCENT FINER ○	□	△
#4	71.9	86.6	76.9
#10	59.7	76.0	68.7
#16	52.7	69.7	64.0
#40	39.3	57.6	55.2
#50	33.7	51.1	50.0
#100	23.1	35.7	37.3
#200	17.9	27.0	28.1

Material Description
○ clayey sand with gravel
□
△ silty sand with gravel

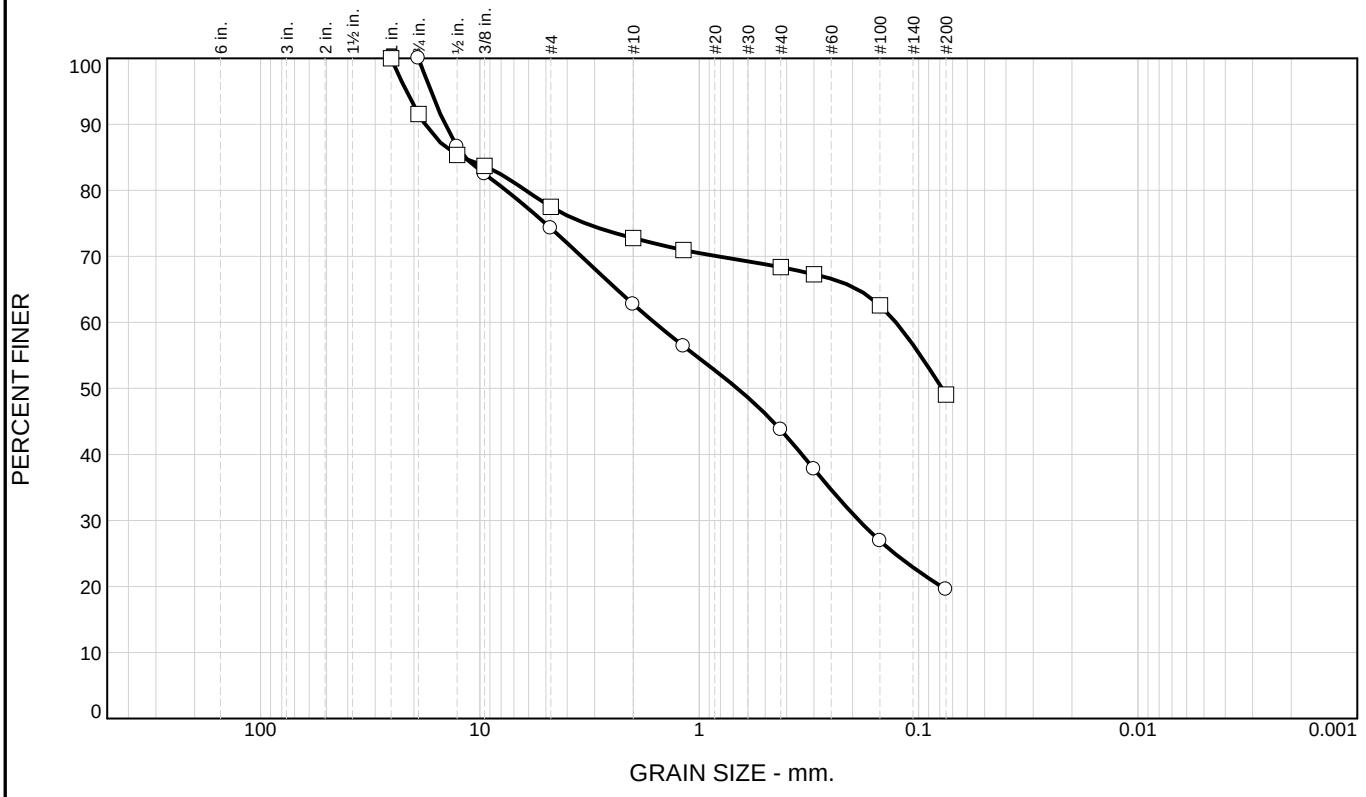
REMARKS:
○
□
△

○ Source of Sample: SWA-6 Depth: 7.5 - 9.0' Sample Number: C
□ Source of Sample: SWA-6 Depth: 10.0 - 11.5' Sample Number: D
△ Source of Sample: SWA-6 Depth: 12.5 - 14.0' Sample Number: E

NEVADA DEPARTMENT OF TRANSPORTATION

Client: A. Ablahani
Project: I-515 Soundwalls, Nellis to Mtn. Vista
Project No.: FL-1-08
Figure

Particle Size Distribution Report



	+3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS	AASHTO	PL	LL
○	0.0	25.7	54.8	19.5		SC	A-2-7(0)	25	41
□	0.0	22.5	28.4	49.1		SC	A-6(6)	15	36

SIEVE inches size	○	□
1		100.0
3/4	100.0	91.6
1/2	86.6	85.4
3/8	82.5	83.7
GRAIN SIZE		
D_{60}	1.6044	0.1267
D_{30}	0.1871	
D_{10}		
COEFFICIENTS		
C_c		
C_u		

SIEVE number size	○	□
#4	74.3	77.5
#10	62.7	72.8
#16	56.4	71.0
#40	43.7	68.4
#50	37.8	67.3
#100	26.9	62.6
#200	19.5	49.1

Material Description

○ clayey sand with gravel

□ clayey sand with gravel

REMARKS:

○

□

○ Source of Sample: SWA-6 Depth: 17.5 - 19.0' Sample Number: F

□ Source of Sample: SWA-6 Depth: 25.0 - 26.5' Sample Number: G

NEVADA DEPARTMENT OF TRANSPORTATION

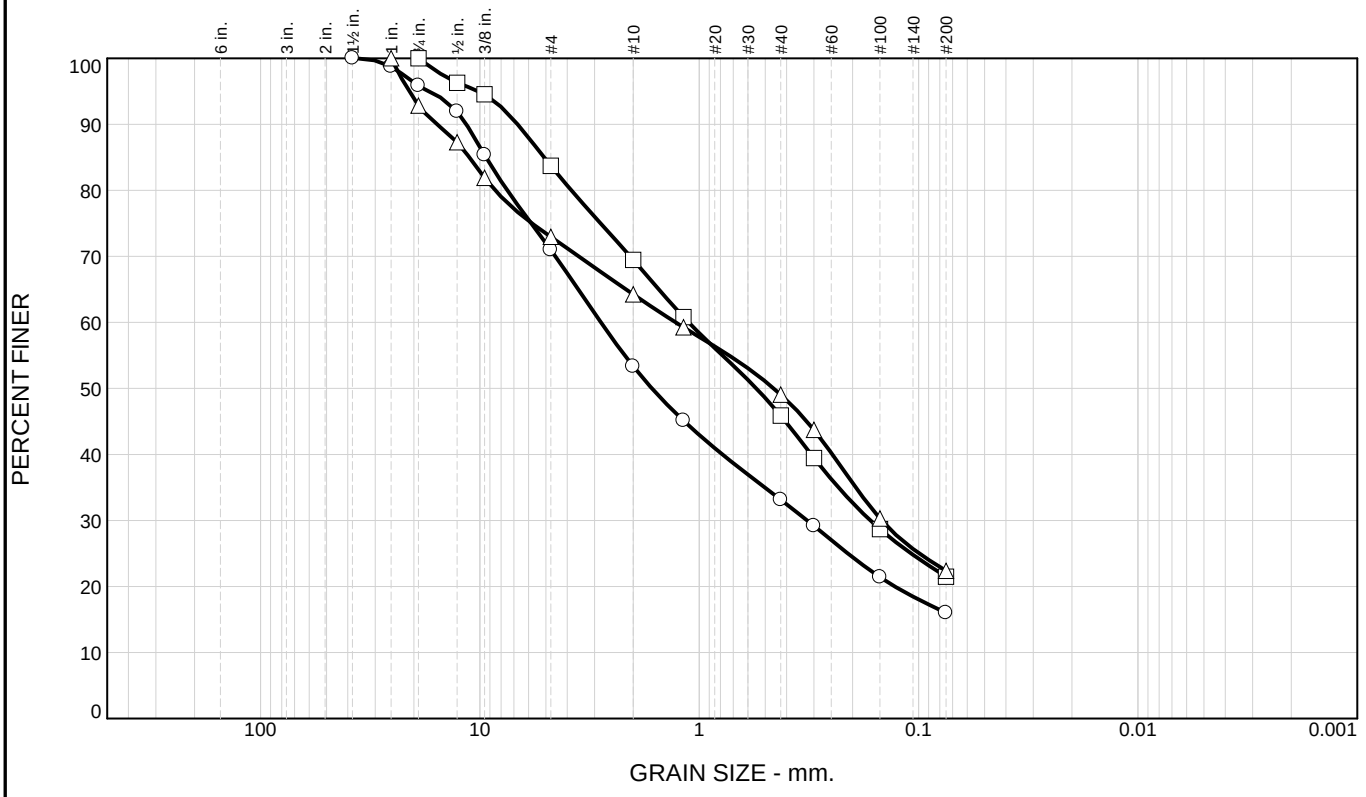
Client: A. Ablahani

Project: I-515 Soundwalls, Nellis to Mtn. Vista

Project No.: FL-1-08

Figure

Particle Size Distribution Report



	+3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS	AASHTO	PL	LL
○	0.0	29.0	55.0	16.0		SC-SM	A-1-b	18	24
□	0.0	16.3	62.2	21.5		SC	A-2-4(0)	19	28
△	0.0	27.0	50.6	22.4		SC	A-2-6(0)	23	35

SIEVE inches size	PERCENT FINER ○	□	△
1-1/2	100.0		
1	98.8		100.0
3/4	95.8	100.0	92.8
1/2	91.9	96.3	87.3
3/8	85.4	94.6	81.9
	GRAIN SIZE		
D_{60}	2.8082	1.1184	1.2805
D_{30}	0.3221	0.1659	0.1473
D_{10}			
	COEFFICIENTS		
C_c			
C_u			

SIEVE number size	PERCENT FINER ○	□	△
#4	71.0	83.7	73.0
#10	53.3	69.5	64.2
#16	45.1	60.8	59.3
#40	33.1	45.9	49.1
#50	29.2	39.5	43.7
#100	21.4	28.7	30.3
#200	16.0	21.5	22.4

Material Description

○ silty, clayey sand with gravel

□ clayey sand with gravel

△ clayey sand with gravel

REMARKS:

○

□

△

○ Source of Sample: SWA-7 Depth: 2.0 - 5.0' Sample Number: BULK 1

□ Source of Sample: SWA-7 Depth: 2.5 - 3.7' Sample Number: A

△ Source of Sample: SWA-7 Depth: 5.0 - 6.5' Sample Number: B

NEVADA DEPARTMENT OF TRANSPORTATION

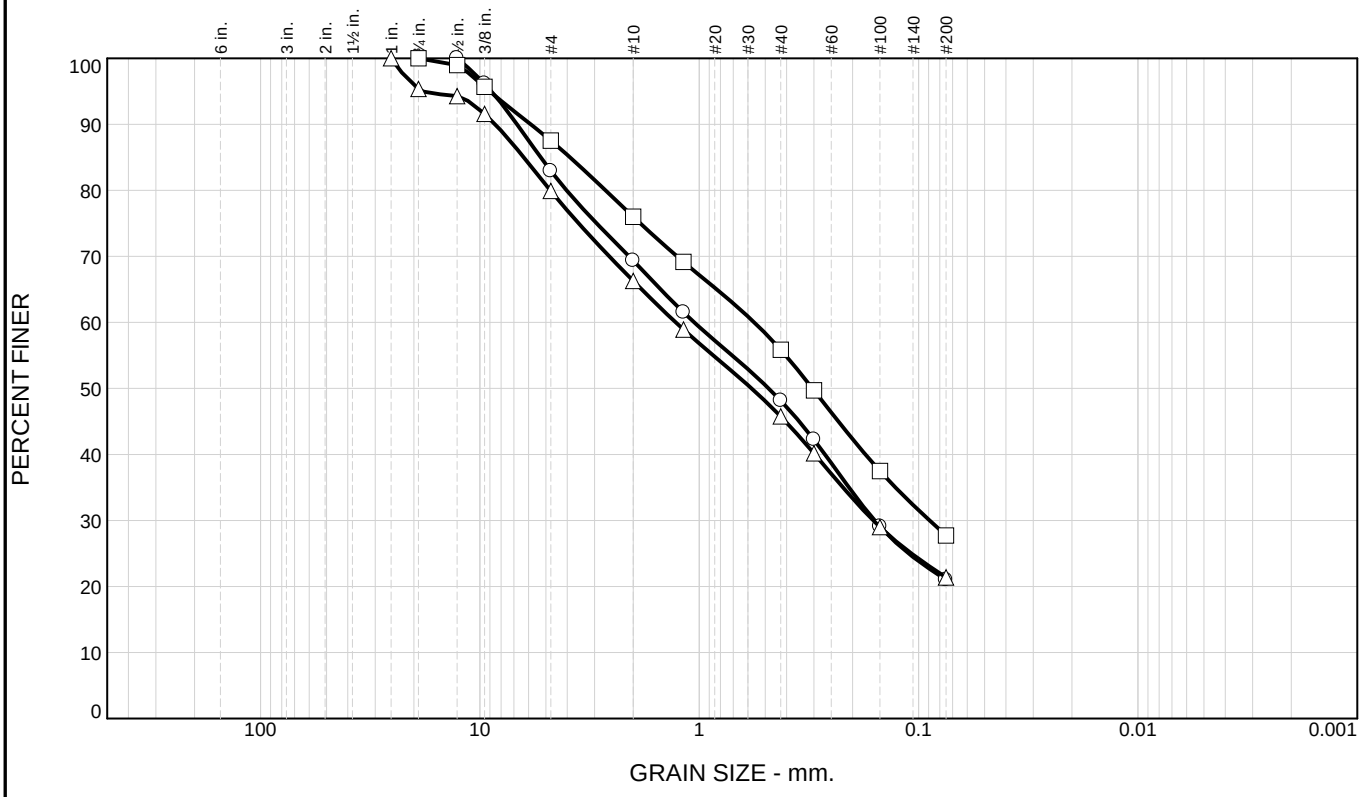
Client: A. Ablahani

Project: I-515 Soundwalls, Nellis to Mtn. Vista

Project No.: FL-1-08

Figure

Particle Size Distribution Report



	+3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS	AASHTO	PL	LL
○	0.0	17.1	61.9	21.0		SC	A-2-4(0)	22	32
□	0.0	12.5	59.8	27.7		SC	A-2-6(1)	23	37
△	0.0	20.1	58.5	21.4		SC	A-2-6(0)	21	32

SIEVE inches size	PERCENT FINER ○	□	△
1			100.0
3/4		100.0	95.4
1/2	100.0	99.0	94.3
3/8	96.2	95.7	91.6
	GRAIN SIZE		
D_{60}	1.0550	0.5608	1.2808
D_{30}	0.1587	0.0890	0.1610
D_{10}			
	COEFFICIENTS		
C_c			
C_u			

SIEVE number size	PERCENT FINER ○	□	△
#4	82.9	87.5	79.9
#10	69.4	76.0	66.3
#16	61.5	69.2	58.9
#40	48.2	55.9	45.8
#50	42.2	49.7	40.2
#100	29.1	37.5	29.0
#200	21.0	27.7	21.4

Material Description
○ clayey sand with gravel
□ clayey sand
△ clayey sand with gravel

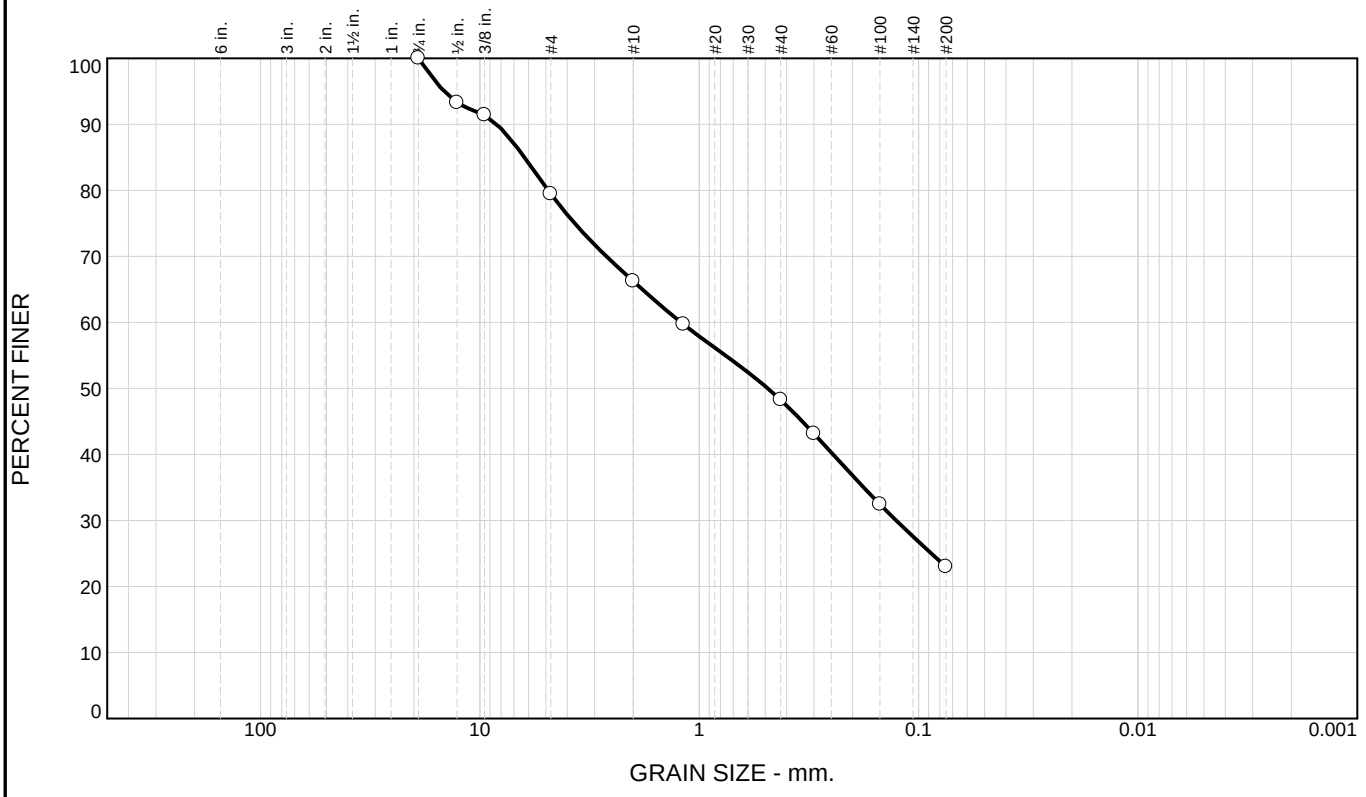
REMARKS:
○
□
△

○ Source of Sample: SWA-7 Depth: 7.5 - 9.0' Sample Number: C
□ Source of Sample: SWA-7 Depth: 10.0 - 11.5' Sample Number: D
△ Source of Sample: SWA-7 Depth: 12.5 - 14.0' Sample Number: E

NEVADA DEPARTMENT OF TRANSPORTATION

Client: A. Ablahani
Project: I-515 Soundwalls, Nellis to Mtn. Vista
Project No.: FL-1-08
Figure

Particle Size Distribution Report



	+3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS	AASHTO	PL	LL
○	0.0	20.6	56.4	23.0		SC	A-2-6(0)	23	39

SIEVE inches size	PERCENT FINER ○		
3/4	100.0		
1/2	93.3		
3/8	91.4		
	GRAIN SIZE		
D_{60}	1.2102		
D_{30}	0.1265		
D_{10}			
	COEFFICIENTS		
C_c			
C_u			

SIEVE number size	PERCENT FINER ○		
#4	79.4		
#10	66.2		
#16	59.7		
#40	48.3		
#50	43.1		
#100	32.4		
#200	23.0		

Material Description
○ clayey sand with gravel

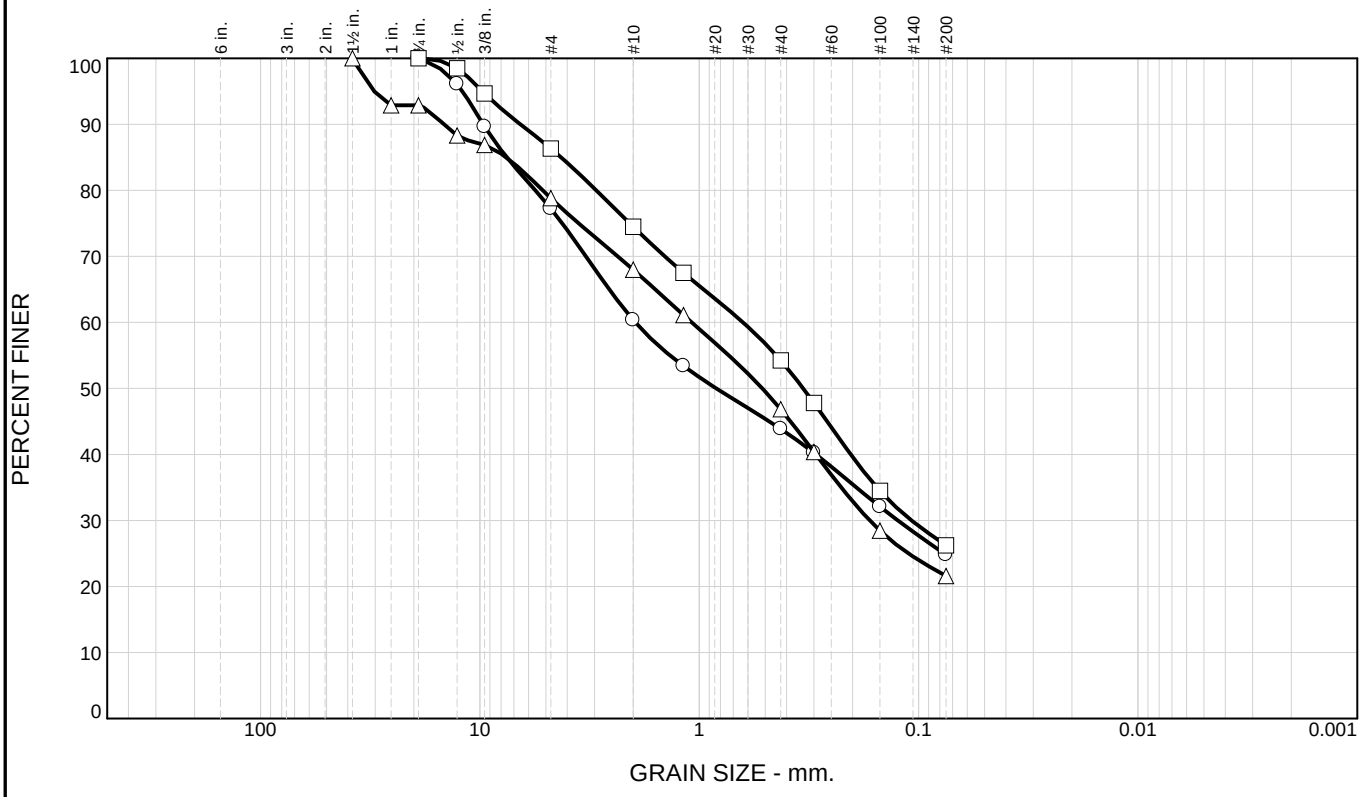
REMARKS:
○

○ Source of Sample: SWA-7 Depth: 15.0 - 16.5' Sample Number: F

NEVADA DEPARTMENT OF TRANSPORTATION

Client: A. Ablahani
Project: I-515 Soundwalls, Nellis to Mtn. Vista
Project No.: FL-1-08 Figure

Particle Size Distribution Report



	+3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS	AASHTO	PL	LL
○	0.0	22.8	52.4	24.8		SC	A-2-6(1)	24	40
□	0.0	13.7	60.1	26.2		SM	A-2-4(0)	27	37
△	0.0	21.2	57.2	21.6		SM	A-2-4(0)	27	35

SIEVE inches size	PERCENT FINER ○	□	△
1-1/2			100.0
1			92.9
3/4	100.0	100.0	92.9
1/2	96.1	98.5	88.3
3/8	89.6	94.7	86.9
GRAIN SIZE			
D_{60}	1.9577	0.6316	1.0819
D_{30}	0.1243	0.1076	0.1671
D_{10}			
COEFFICIENTS			
C_c			
C_u			

SIEVE number size	PERCENT FINER ○	□	△
#4	77.2	86.3	78.8
#10	60.4	74.5	68.0
#16	53.4	67.5	61.1
#40	43.9	54.2	46.8
#50	40.3	47.8	40.4
#100	32.1	34.5	28.5
#200	24.8	26.2	21.6

Material Description
○ clayey sand with gravel
□ silty sand
△ silty sand with gravel

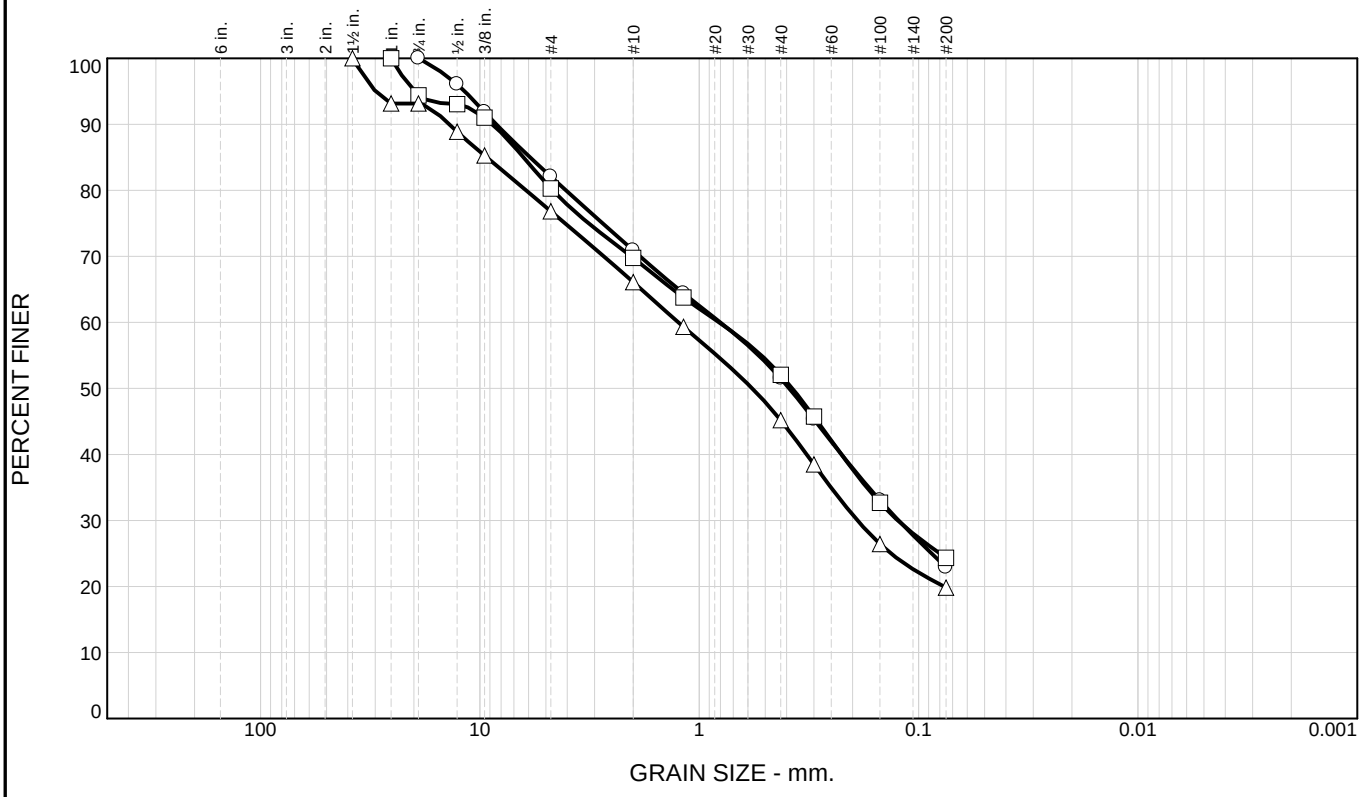
REMARKS:
○
□
△

○ Source of Sample: SWA-8 Depth: 2.0 - 5.0' Sample Number: BULK 1
□ Source of Sample: SWA-8 Depth: 2.5 - 4.0' Sample Number: A
△ Source of Sample: SWA-8 Depth: 5.0 - 6.5' Sample Number: B

NEVADA DEPARTMENT OF TRANSPORTATION

Client: A. Ablahani
Project: I-515 Soundwalls, Nellis to Mtn. Vista
Project No.: FL-1-08
Figure

Particle Size Distribution Report



	+3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS	AASHTO	PL	LL
○	0.0	17.9	59.2	22.9		SM	A-2-4(0)	28	38
□	0.0	19.7	56.0	24.3		SC	A-2-6(0)	24	39
△	0.0	23.2	57.0	19.8					

SIEVE inches size	PERCENT FINER ○	□	△
1-1/2			100.0
1		100.0	93.2
3/4	100.0	94.4	93.2
1/2	96.1	93.1	88.9
3/8	91.8	91.0	85.3
	GRAIN SIZE		
D_{60}	0.8006	0.8119	1.2448
D_{30}	0.1233	0.1244	0.1900
D_{10}			
	COEFFICIENTS		
C_c			
C_u			

SIEVE number size	PERCENT FINER ○	□	△
#4	82.1	80.3	76.8
#10	70.9	69.8	66.1
#16	64.4	63.8	59.3
#40	51.5	52.1	45.2
#50	45.3	45.7	38.5
#100	33.0	32.7	26.4
#200	22.9	24.3	19.8

Material Description
○ silty sand with gravel
□ clayey sand with gravel
△

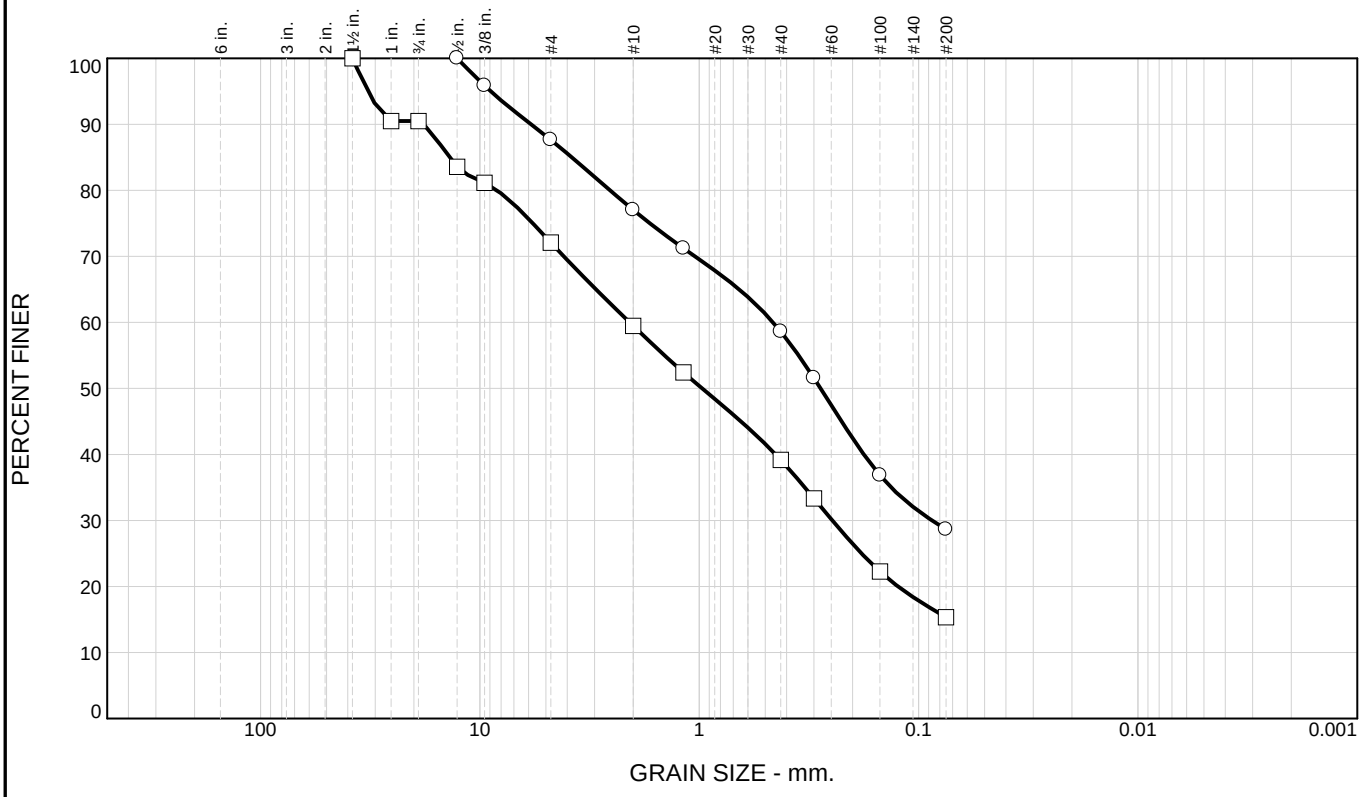
REMARKS:
○
□
△

○ Source of Sample: SWA-8 Depth: 7.5 - 9.0' Sample Number: C
□ Source of Sample: SWA-8 Depth: 10.0 - 11.5' Sample Number: D
△ Source of Sample: SWA-8 Depth: 12.5 - 14.0' Sample Number: E

NEVADA DEPARTMENT OF TRANSPORTATION

Client: A. Ablahani
Project: I-515 Soundwalls, Nellis to Mtn. Vista
Project No.: FL-1-08
Figure

Particle Size Distribution Report



	+3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS	AASHTO	PL	LL
○	0.0	12.4	59.0	28.6		SM	A-2-4(0)	31	40
□	0.0	27.9	56.8	15.3		SM	A-1-b	23	29

SIEVE inches size	○	□
1-1/2		100.0
1		90.5
3/4		90.5
1/2	100.0	83.6
3/8	95.9	81.2
GRAIN SIZE		
D_{60}	0.4605	2.0769
D_{30}	0.0868	0.2473
D_{10}		
COEFFICIENTS		
C_c		
C_u		

SIEVE number size	○	□
#4	87.6	72.1
#10	77.0	59.5
#16	71.2	52.4
#40	58.6	39.2
#50	51.6	33.3
#100	36.8	22.3
#200	28.6	15.3

Material Description
○ silty sand

□ silty sand with gravel

REMARKS:
○

□

○ Source of Sample: SWA-8 Depth: 15.0 - 16.5' Sample Number: F

□ Source of Sample: SWA-8 Depth: 20.0 - 21.5' Sample Number: G

NEVADA DEPARTMENT OF TRANSPORTATION

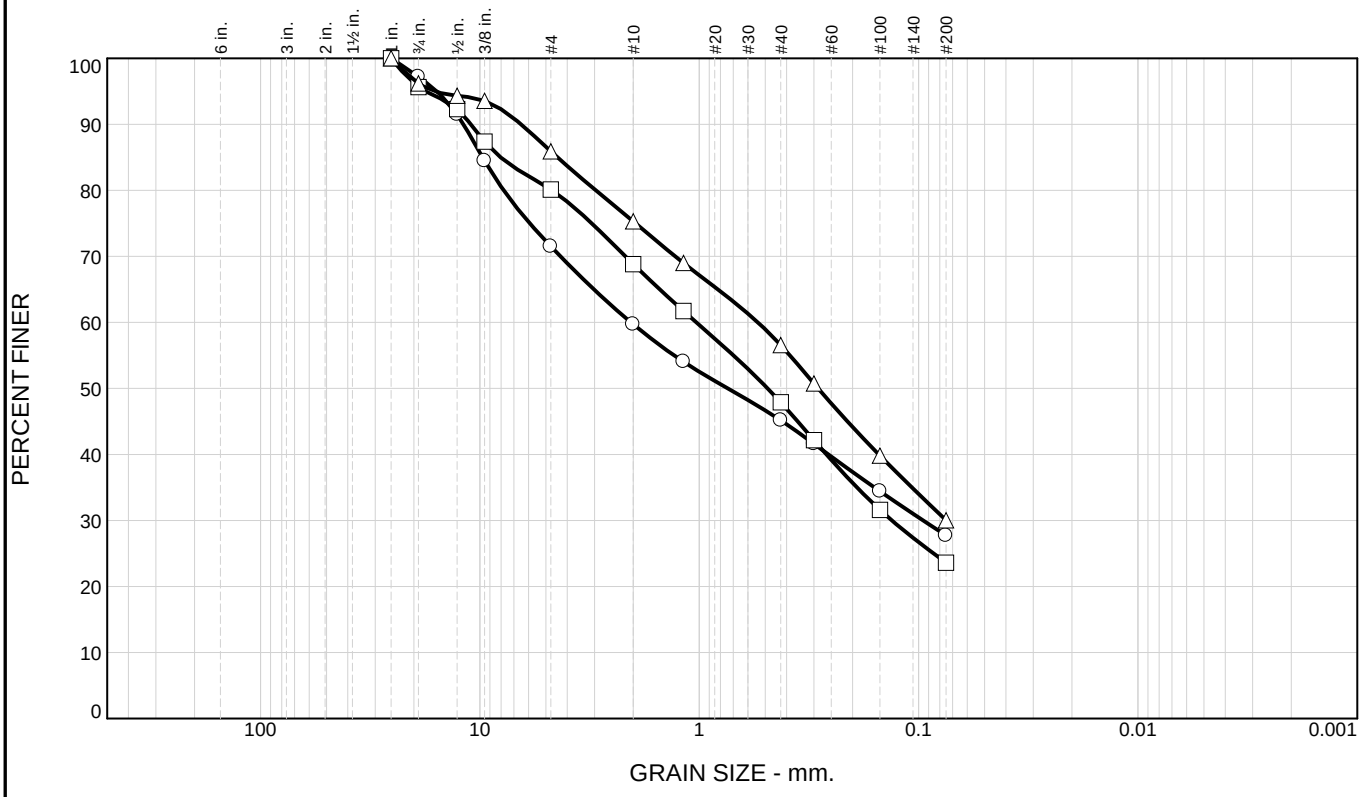
Client: A. Ablahani

Project: I-515 Soundwalls, Nellis to Mtn. Vista

Project No.: FL-1-08

Figure

Particle Size Distribution Report



	+3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS	AASHTO	PL	LL
○	0.0	28.5	43.8	27.7		SC	A-2-6(1)	23	40
□	0.0	19.9	56.5	23.6		SM	A-2-4(0)	29	39
△	0.0	14.1	55.9	30.0		SM	A-2-7(1)	32	47

SIEVE inches size	PERCENT FINER ○	□	△
1	100.0	100.0	100.0
3/4	97.2	95.7	96.2
1/2	91.5	92.3	94.3
3/8	84.5	87.4	93.6
GRAIN SIZE			
D_{60}	2.0496	1.0312	0.5401
D_{30}	0.0953	0.1324	
D_{10}			
COEFFICIENTS			
C_c			
C_u			

SIEVE number size	PERCENT FINER ○	□	△
#4	71.5	80.1	85.9
#10	59.7	68.8	75.3
#16	54.0	61.7	69.0
#40	45.2	47.9	56.6
#50	41.6	42.2	50.7
#100	34.4	31.6	39.8
#200	27.7	23.6	30.0

Material Description
○ clayey sand with gravel
□ silty sand with gravel
△ silty sand

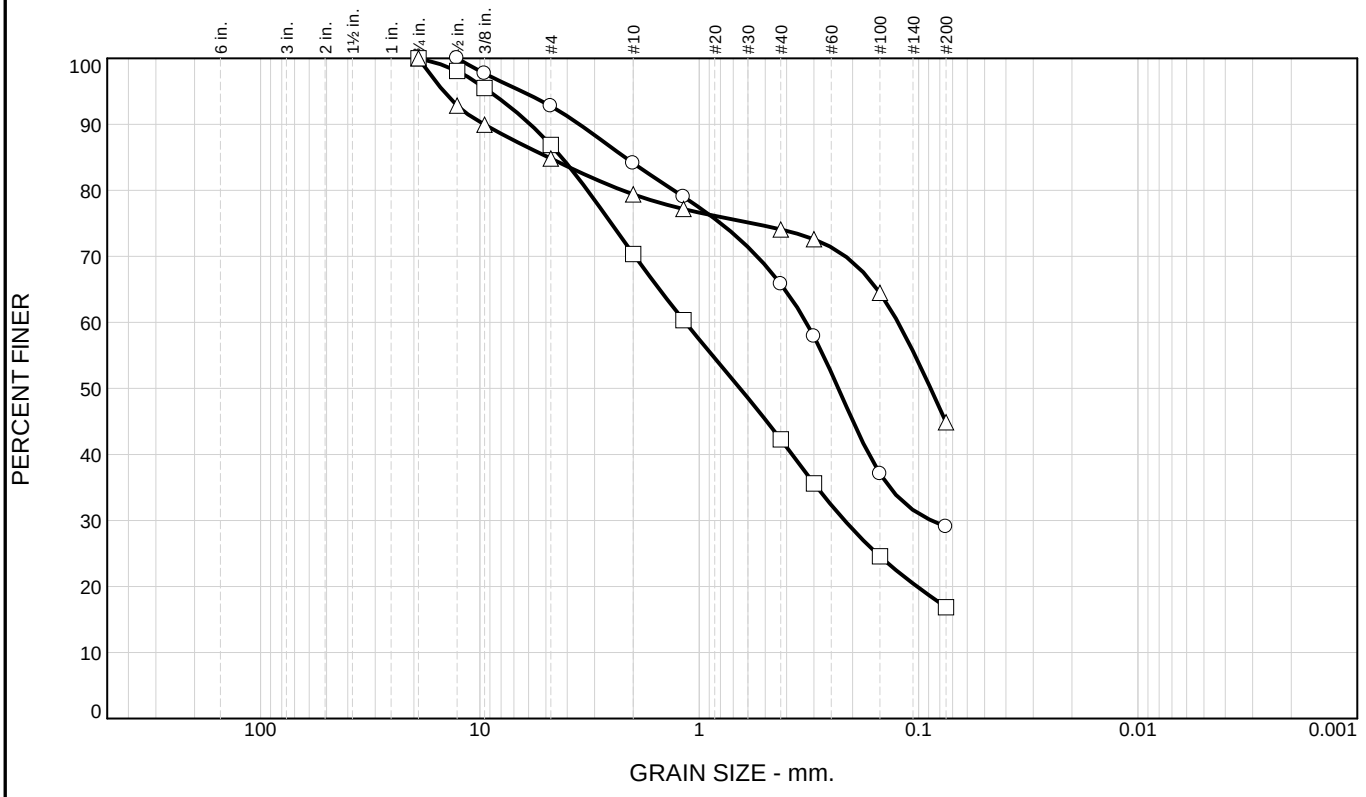
REMARKS:
○
□
△

○ Source of Sample: SWA-9 Depth: 2.5 - 5.0' Sample Number: BULK 1
□ Source of Sample: SWA-9 Depth: 2.5 - 4.0' Sample Number: A
△ Source of Sample: SWA-9 Depth: 5.0 - 6.5' Sample Number: B

NEVADA DEPARTMENT OF TRANSPORTATION

Client: A. Ablahani
Project: I-515 Soundwalls, Nellis to Mtn. Vista
Project No.: FL-1-08
Figure

Particle Size Distribution Report



	+3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS	AASHTO	PL	LL
○	0.0	7.2	63.8	29.0		SC	A-2-4(0)	22	30
□	0.0	13.1	70.0	16.9		SM	A-2-4(0)	29	37
△	0.0	15.2	39.9	44.9		SC	A-6(4)	15	32

SIEVE inches size	PERCENT FINER ○	□	△
3/4		100.0	100.0
1/2	100.0	98.1	92.8
3/8	97.7	95.5	90.0
	GRAIN SIZE		
D_{60}	0.3248	1.1576	0.1240
D_{30}	0.0875	0.2174	
D_{10}			
	COEFFICIENTS		
C_c			
C_u			

SIEVE number size	PERCENT FINER ○	□	△
#4	92.8	86.9	84.8
#10	84.1	70.4	79.4
#16	79.0	60.3	77.2
#40	65.8	42.3	74.1
#50	57.9	35.6	72.6
#100	37.1	24.6	64.5
#200	29.0	16.9	44.9

Material Description
○ clayey sand
□ silty sand
△ clayey sand with gravel

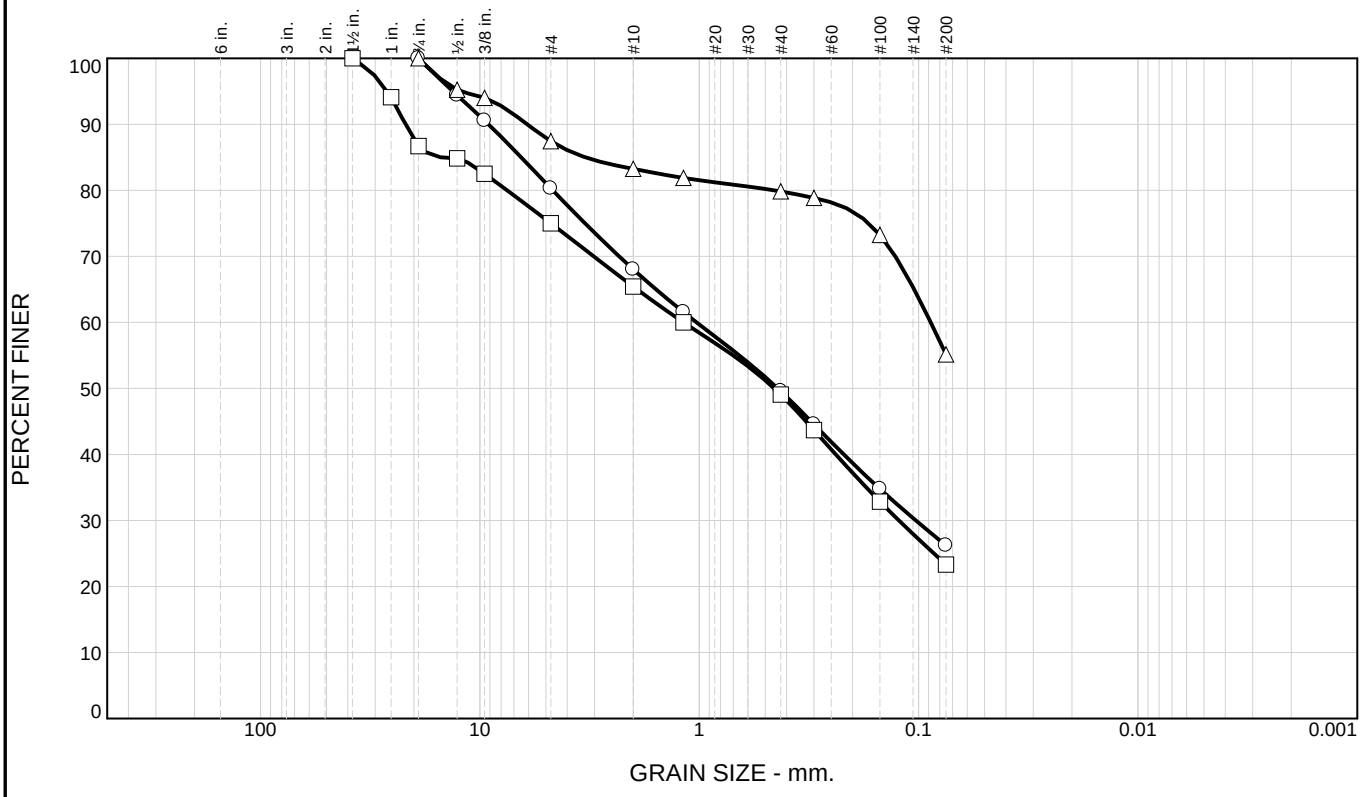
REMARKS:
○
□
△

○ Source of Sample: SWA-9 Depth: 10.0 - 11.5' Sample Number: C
□ Source of Sample: SWA-9 Depth: 15.0 - 16.5' Sample Number: D
△ Source of Sample: SWA-9 Depth: 20.0 - 21.5' Sample Number: E

NEVADA DEPARTMENT OF TRANSPORTATION

Client: A. Ablahani
Project: I-515 Soundwalls, Nellis to Mtn. Vista
Project No.: FL-1-08
Figure

Particle Size Distribution Report



	+3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS	AASHTO	PL	LL
○	0.0	19.7	54.1	26.2		SC	A-2-4(0)	18	26
□	0.0	25.0	51.7	23.3		SM	A-2-4(0)	28	35
△	0.0	12.5	32.4	55.1		CL	A-6(10)	15	40

SIEVE inches size	PERCENT FINER ○	□	△
1-1/2		100.0	
1		94.1	
3/4	100.0	86.7	100.0
1/2	94.4	84.8	95.2
3/8	90.6	82.5	94.0
	GRAIN SIZE		
D_{60}	1.0276	1.1794	0.0880
D_{30}	0.1028	0.1229	
D_{10}			
	COEFFICIENTS		
C_c			
C_u			

SIEVE number size	PERCENT FINER ○	□	△
#4	80.3	75.0	87.5
#10	68.0	65.4	83.3
#16	61.6	60.0	81.9
#40	49.6	49.1	79.8
#50	44.6	43.7	78.9
#100	34.8	32.8	73.3
#200	26.2	23.3	55.1

Material Description
○ clayey sand with gravel
□ silty sand with gravel
△ sandy lean clay

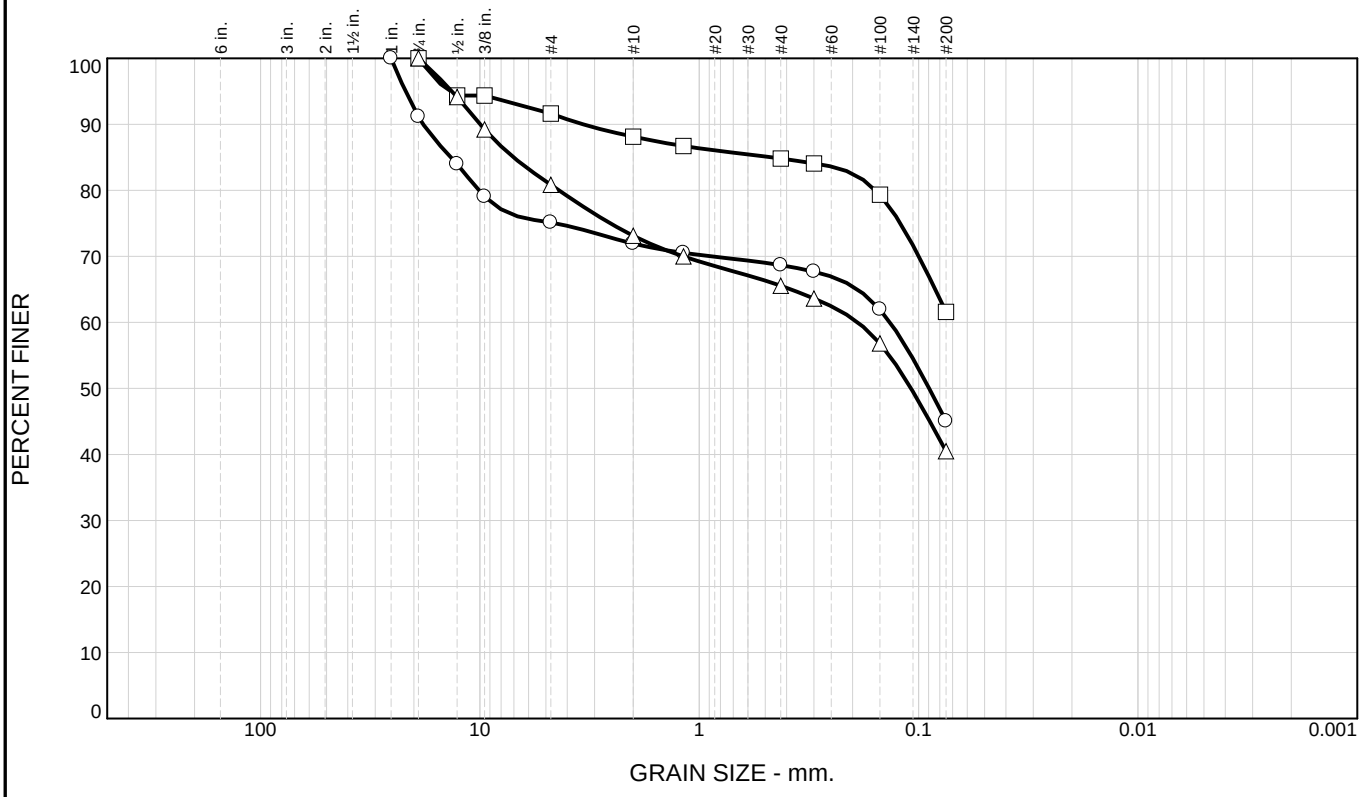
REMARKS:
○
□
△

○ Source of Sample: SWA-10 Depth: 2.0 - 5.0' Sample Number: BULK 1
□ Source of Sample: SWA-10 Depth: 5.0 - 6.5' Sample Number: B
△ Source of Sample: SWA-10 Depth: 7.5 - 9.0' Sample Number: C

NEVADA DEPARTMENT OF TRANSPORTATION

Client: A. Ablahani
Project: I-515 Soundwalls, Nellis to Mtn. Vista
Project No.: FL-1-08 Figure

Particle Size Distribution Report



	+3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS	AASHTO	PL	LL
○	0.0	24.9	30.0	45.1		SC	A-6(5)	14	36
□	0.0	8.4	30.0	61.6					
△	0.0	19.2	40.3	40.5		SC	A-6(2)	16	31

SIEVE inches size	PERCENT FINER ○	□	△
1	100.0		
3/4	91.2	100.0	100.0
1/2	84.0	94.4	94.1
3/8	79.1	94.4	89.2
GRAIN SIZE			
D_{60}	0.1348		0.1891
D_{30}			
D_{10}			
COEFFICIENTS			
C_c			
C_u			

SIEVE number size	PERCENT FINER ○	□	△
#4	75.1	91.6	80.8
#10	71.9	88.1	73.1
#16	70.5	86.7	70.0
#40	68.7	84.8	65.6
#50	67.7	84.1	63.6
#100	62.0	79.3	56.8
#200	45.1	61.6	40.5

Material Description
○ clayey sand with gravel
□
△ clayey sand with gravel

REMARKS:
○
□
△

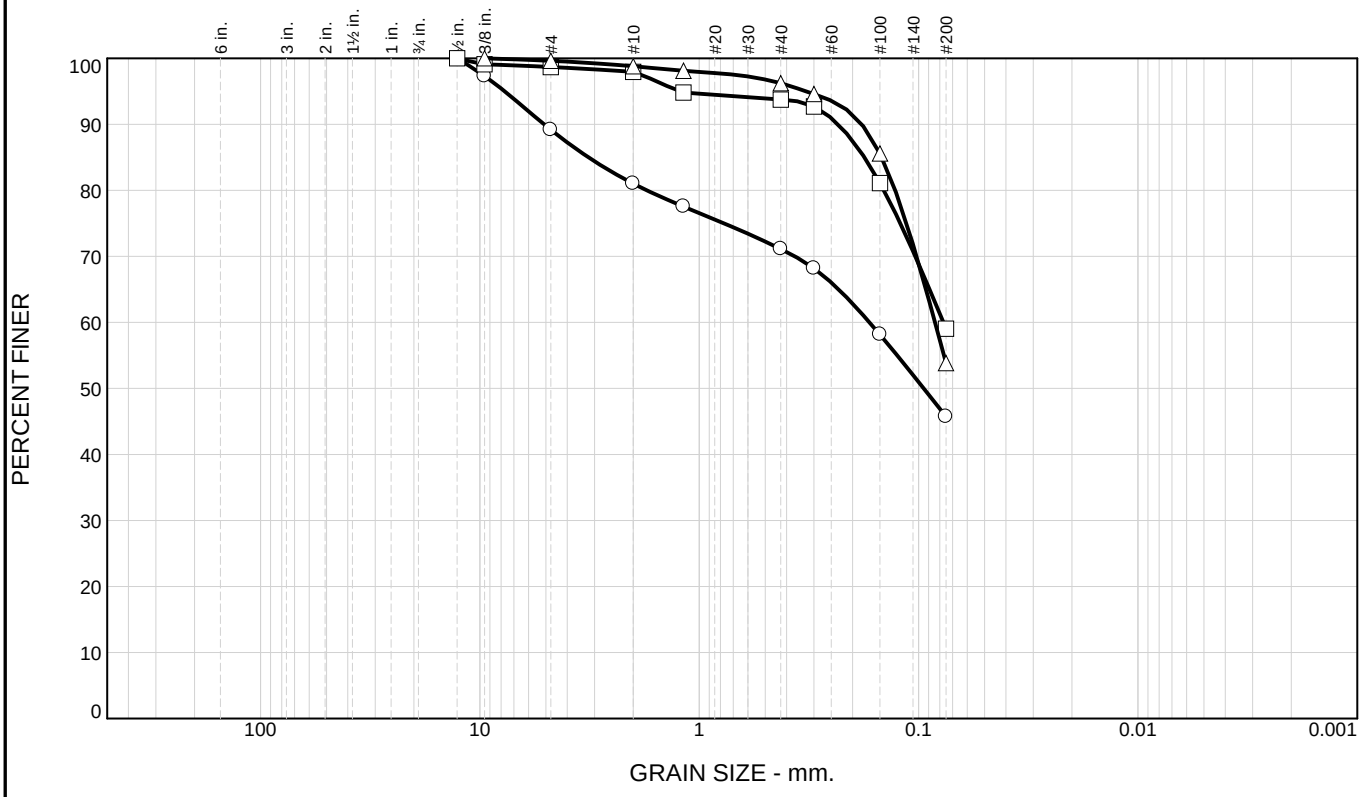
○ Source of Sample: SWA-10 Depth: 10.2 - 10.7' Sample Number: D1
□ Source of Sample: SWA-10 Depth: 10.7 - 11.2' Sample Number: D2
△ Source of Sample: SWA-10 Depth: 11.5 - 13.0' Sample Number: E

NEVADA DEPARTMENT OF TRANSPORTATION

Client: A. Ablahani
Project: I-515 Soundwalls, Nellis to Mtn. Vista
Project No.: FL-1-08

Figure

Particle Size Distribution Report



	+3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS	AASHTO	PL	LL
○	0.0	10.8	43.5	45.7		SC	A-6(5)	19	38
□	0.0	1.3	39.7	59.0		CL	A-6(4)	18	30
△	0.0	0.4	45.8	53.8		CL	A-6(3)	17	28

SIEVE inches size	PERCENT FINER ○	□	△
1/2	100.0	100.0	
3/8	97.3	99.1	100.0
	GRAIN SIZE		
D_{60}	0.1673	0.0771	0.0841
D_{30}			
D_{10}			
	COEFFICIENTS		
C_c			
C_u			

SIEVE number size	PERCENT FINER ○	□	△
#4	89.2	98.7	99.6
#10	81.0	98.0	98.8
#16	77.5	94.8	98.1
#40	71.1	93.7	96.2
#50	68.2	92.7	94.6
#100	58.2	81.1	85.6
#200	45.7	59.0	53.8

Material Description
○ clayey sand
□ sandy lean clay
△ sandy lean clay

REMARKS:
○
□
△

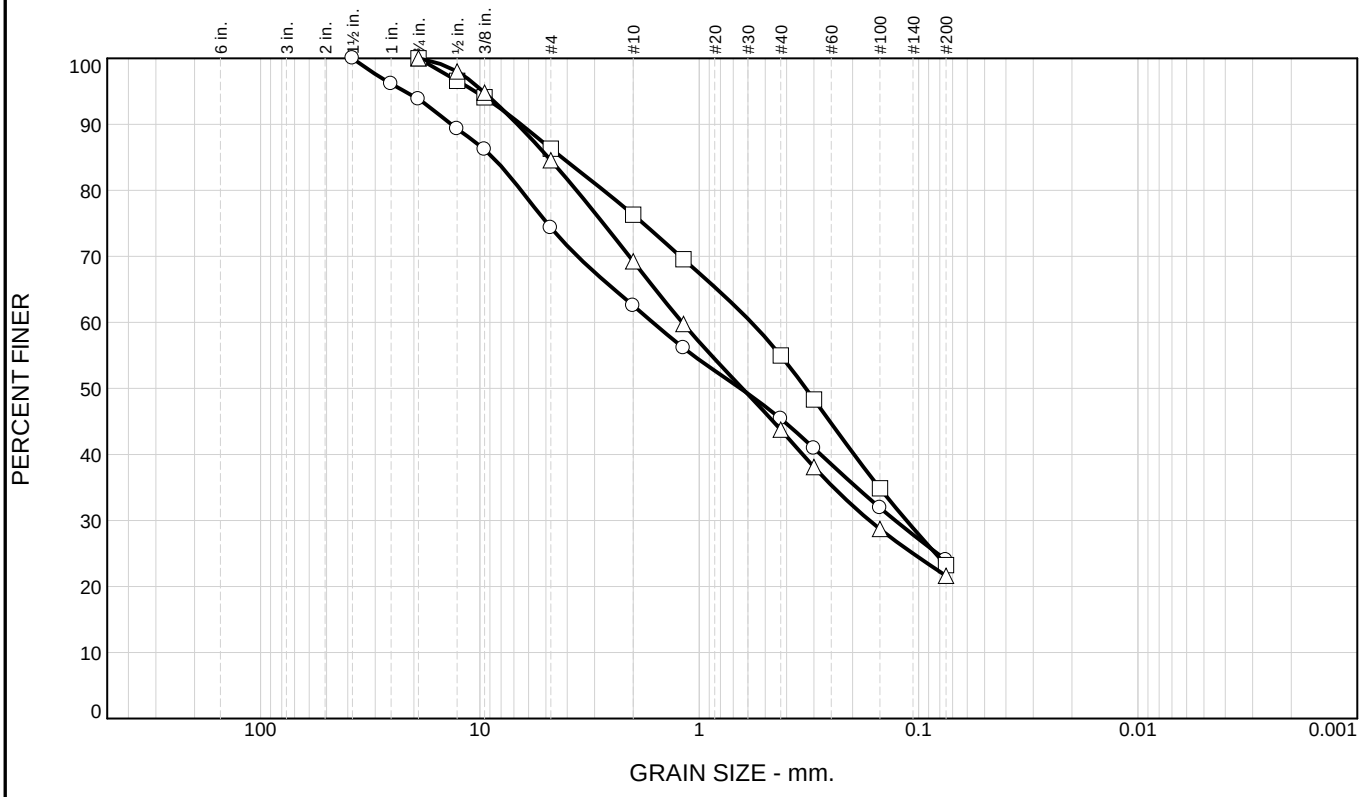
○ Source of Sample: SWA-10 Depth: 15.0 - 16.5' Sample Number: F
□ Source of Sample: SWA-10 Depth: 20.0 - 21.5' Sample Number: G
△ Source of Sample: SWA-10 Depth: 25.0 - 26.5' Sample Number: H

NEVADA DEPARTMENT OF TRANSPORTATION

Client: A. Ablahani
Project: I-515 Soundwalls, Nellis to Mtn. Vista
Project No.: FL-1-08

Figure

Particle Size Distribution Report



	+3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS	AASHTO	PL	LL
○	0.0	25.7	50.3	24.0		SC	A-2-6(0)	23	34
□	0.0	13.7	63.1	23.2		SM	A-2-4(0)	27	31
△	0.0	15.5	62.9	21.6		SM	A-2-4(0)	29	36

SIEVE inches size	PERCENT FINER ○	□	△
1-1/2	100.0		
1	96.1		
3/4	93.8	100.0	100.0
1/2	89.3	96.6	98.0
3/8	86.2	94.1	94.8
	GRAIN SIZE		
D_{60}	1.6300	0.5781	1.1964
D_{30}	0.1278	0.1135	0.1673
D_{10}			
	COEFFICIENTS		
C_c			
C_u			

SIEVE number size	PERCENT FINER ○	□	△
#4	74.3	86.3	84.5
#10	62.5	76.3	69.3
#16	56.1	69.6	59.8
#40	45.4	55.0	43.8
#50	40.9	48.3	38.1
#100	31.9	34.9	28.7
#200	24.0	23.2	21.6

Material Description
○ clayey sand with gravel
□ silty sand
△ silty sand with gravel

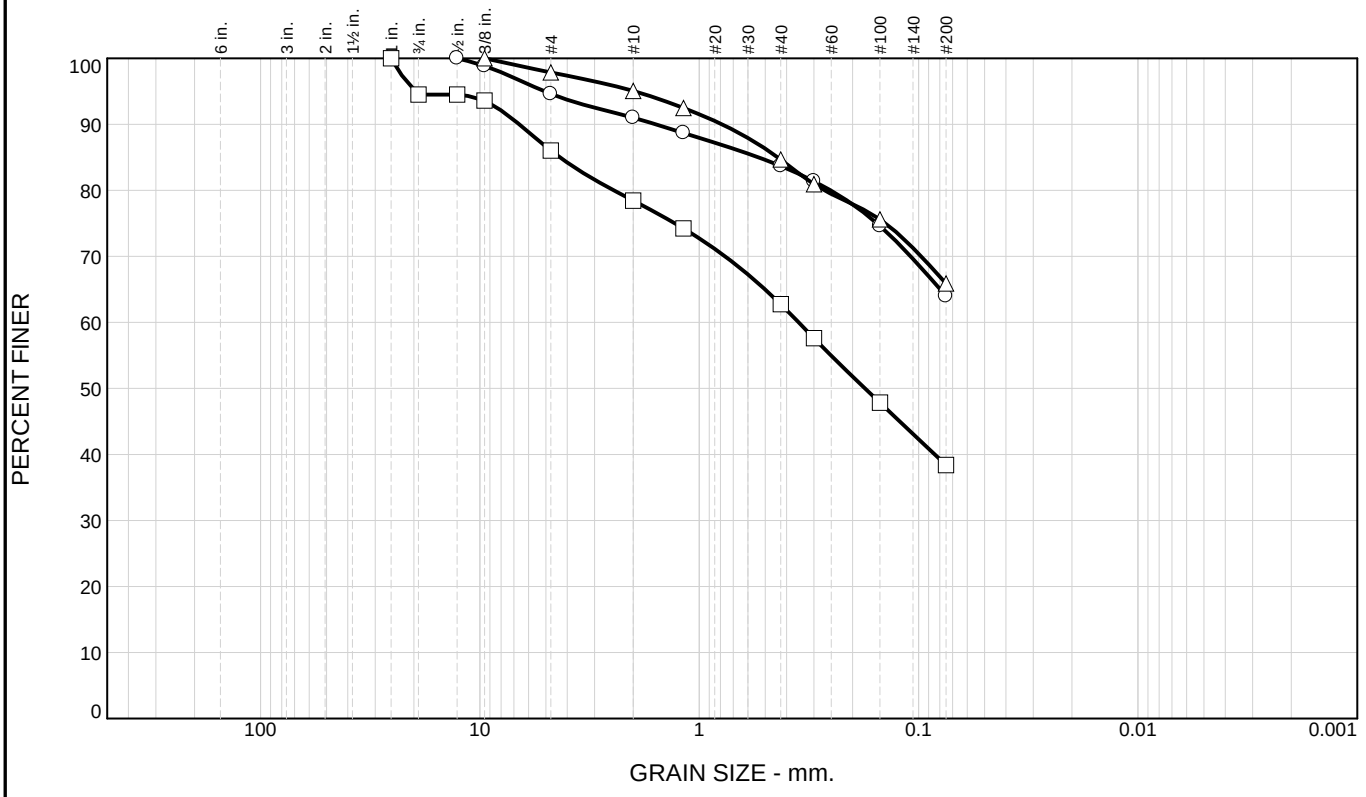
REMARKS:
○
□
△

○ Source of Sample: SWB-1 Depth: 2.0 - 5.0' Sample Number: BULK 1
□ Source of Sample: SWB-1 Depth: 2.5 - 4.0' Sample Number: A
△ Source of Sample: SWB-1 Depth: 7.5 - 8.5' Sample Number: C1

NEVADA DEPARTMENT OF TRANSPORTATION

Client: A. Ablahani
Project: I-515 Soundwalls, Nellis to Mtn. Vista
Project No.: FL-1-08
Figure

Particle Size Distribution Report



	+3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS	AASHTO	PL	LL
○	0.0	5.4	30.6	64.0		CL	A-6(11)	20	40
□	0.0	14.0	47.6	38.4		SM	A-4(0)	25	33
△	0.0	2.1	32.0	65.9		CH	A-7-6(20)	26	58

SIEVE inches size	PERCENT FINER ○	□	△
1		100.0	
3/4		94.5	
1/2	100.0	94.5	
3/8	98.8	93.6	100.0
GRAIN SIZE			
D_{60}		0.3521	
D_{30}			
D_{10}			
COEFFICIENTS			
C_c			
C_u			

SIEVE number size	PERCENT FINER ○	□	△
#4	94.6	86.0	97.9
#10	91.0	78.4	95.1
#16	88.7	74.2	92.5
#40	83.7	62.8	84.7
#50	81.4	57.6	80.9
#100	74.6	47.8	75.6
#200	64.0	38.4	65.9

Material Description
○ sandy lean clay
□ silty sand
△ sandy fat clay

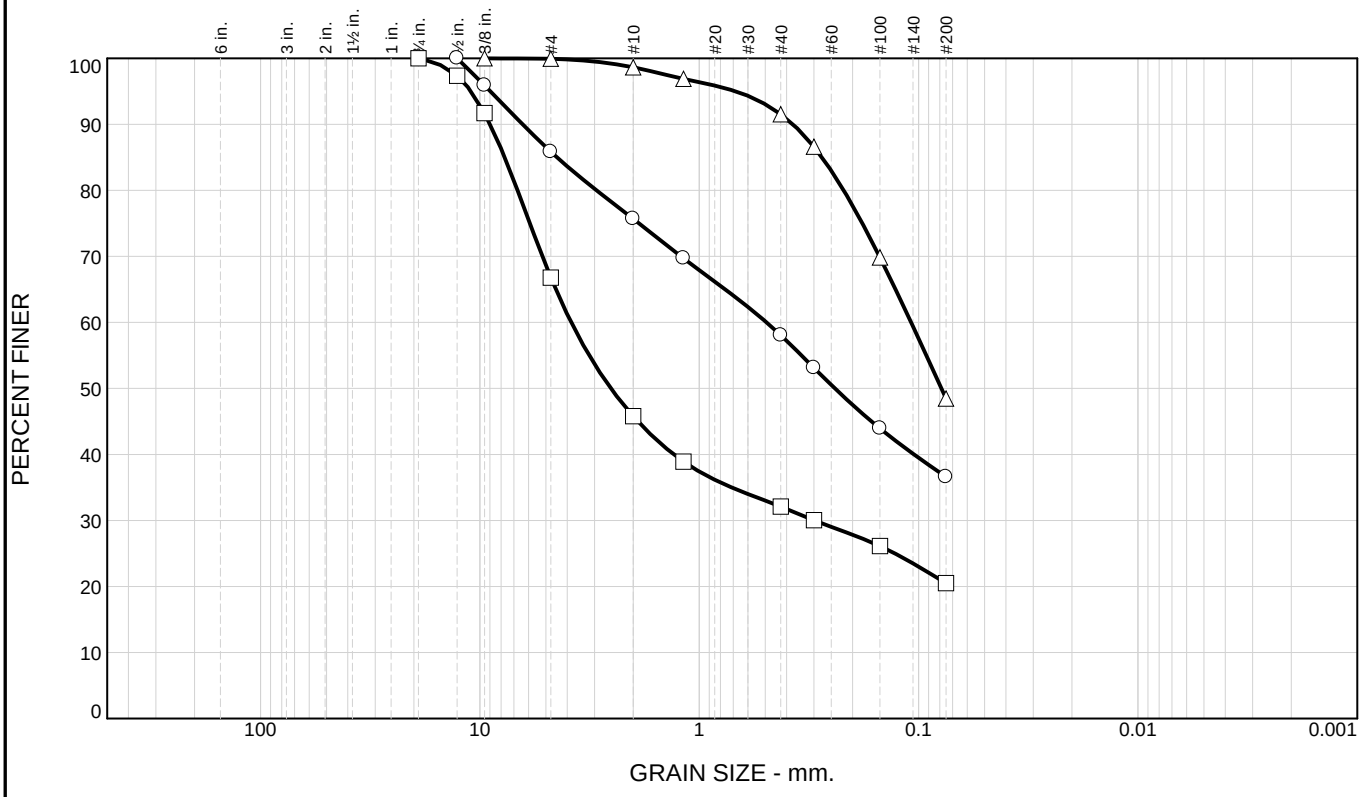
REMARKS:
○
□
△

○ Source of Sample: SWB-1 Depth: 8.5 - 9.0' Sample Number: C2
□ Source of Sample: SWB-1 Depth: 10.2 - 10.7' Sample Number: D1
△ Source of Sample: SWB-1 Depth: 10.7 - 11.2' Sample Number: D2

NEVADA DEPARTMENT OF TRANSPORTATION

Client: A. Ablahani
Project: I-515 Soundwalls, Nellis to Mtn. Vista
Project No.: FL-1-08
Figure

Particle Size Distribution Report



	+3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS	AASHTO	PL	LL
○	0.0	14.2	49.2	36.6		SC-SM	A-4(0)	22	29
□	0.0	33.2	46.3	20.5		SC	A-2-6(0)	22	37
△	0.0	0.1	51.4	48.5		SC	A-7-6(9)	24	51

SIEVE inches size	PERCENT FINER ○	□	△
3/4		100.0	
1/2	100.0	97.4	
3/8	95.9	91.7	100.0
	GRAIN SIZE		
D_{60}	0.4933	3.8384	0.1081
D_{30}		0.2981	
D_{10}			
	COEFFICIENTS		
C_c			
C_u			

SIEVE number size	PERCENT FINER ○	□	△
#4	85.8	66.8	99.9
#10	75.7	45.8	98.6
#16	69.7	38.9	96.9
#40	58.1	32.1	91.5
#50	53.1	30.0	86.6
#100	43.9	26.1	69.8
#200	36.6	20.5	48.5

Material Description
○ silty, clayey sand

□ clayey sand with gravel

△ clayey sand

REMARKS:
○

□

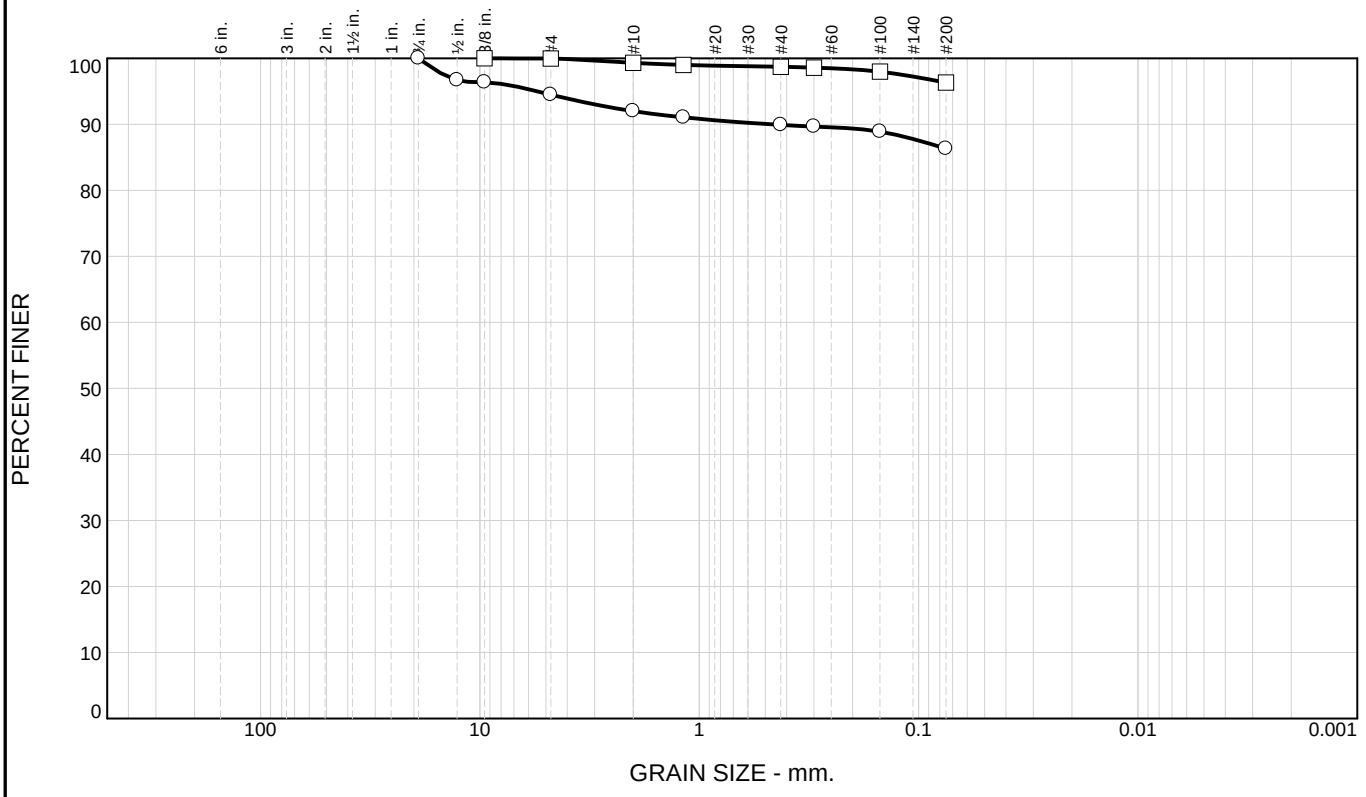
△

○ Source of Sample: SWB-1 Depth: 11.5 - 13.0' Sample Number: E
□ Source of Sample: SWB-1 Depth: 15.2 - 15.7' Sample Number: F1
△ Source of Sample: SWB-1 Depth: 15.7 - 16.2' Sample Number: F2

NEVADA DEPARTMENT OF TRANSPORTATION

Client: A. Ablahani
Project: I-515 Soundwalls, Nellis to Mtn. Vista
Project No.: FL-1-08
Figure

Particle Size Distribution Report



	+3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS	AASHTO	PL	LL
○	0.0	5.5	8.2	86.3		CH	A-7-6(29)	20	52
□	0.0	0.0	3.7	96.3		CL	A-7-6(26)	23	47

SIEVE inches size	PERCENT FINER ○	PERCENT FINER □
3/4	100.0	
1/2	96.7	
3/8	96.4	100.0
GRAIN SIZE		
D_{60}		
D_{30}		
D_{10}		
COEFFICIENTS		
C_c		
C_u		

SIEVE number size	PERCENT FINER ○	PERCENT FINER □
#4	94.5	100.0
#10	92.0	99.3
#16	91.1	99.0
#40	89.9	98.7
#50	89.7	98.6
#100	88.9	98.0
#200	86.3	96.3

Material Description
○ fat clay

□ lean clay

REMARKS:
○

□

○ Source of Sample: SWB-1 Depth: 20.0 - 21.5' Sample Number: G

□ Source of Sample: SWB-1 Depth: 25.0 - 26.5' Sample Number: H

NEVADA DEPARTMENT OF TRANSPORTATION

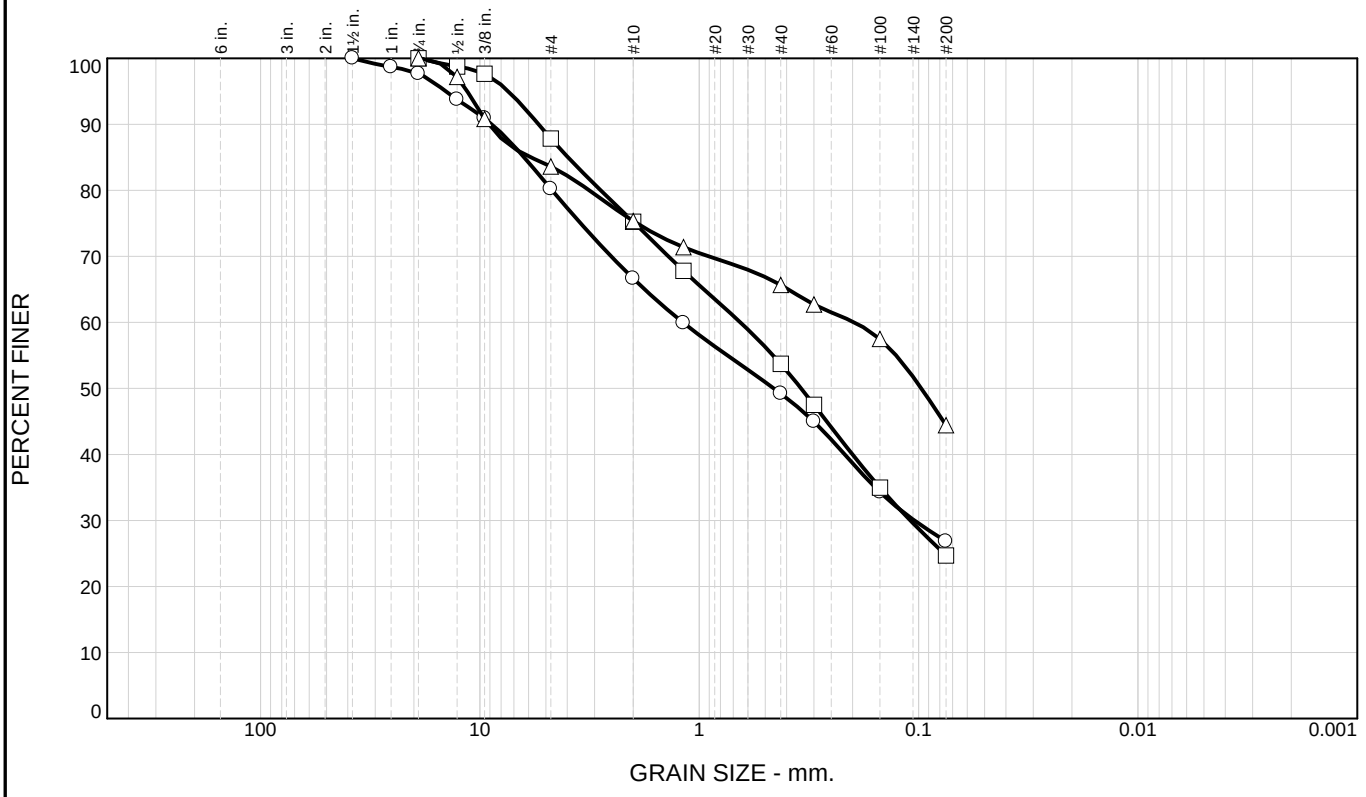
Client: A. Ablahani

Project: I-515 Soundwalls, Nellis to Mtn. Vista

Project No.: FL-1-08

Figure

Particle Size Distribution Report



	+3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS	AASHTO	PL	LL
○	0.0	19.8	53.4	26.8		SC	A-2-6(0)	24	35
□	0.0	12.2	63.1	24.7		SM	A-2-4(0)	27	33
△	0.0	16.4	39.2	44.4		SC	A-7-6(4)	22	41

SIEVE inches size	PERCENT FINER ○	□	△
1-1/2	100.0		
1	98.7		
3/4	97.7	100.0	100.0
1/2	93.7	98.8	97.2
3/8	90.9	97.7	90.8
	GRAIN SIZE		
D_{60}	1.1882	0.6490	0.1962
D_{30}	0.1045	0.1089	
D_{10}			
	COEFFICIENTS		
C_c			
C_u			

SIEVE number size	PERCENT FINER ○	□	△
#4	80.2	87.8	83.6
#10	66.6	75.2	75.4
#16	59.9	67.8	71.4
#40	49.2	53.7	65.7
#50	45.0	47.5	62.7
#100	34.3	35.0	57.5
#200	26.8	24.7	44.4

Material Description
○ clayey sand with gravel
□ silty sandsilty sand
△ clayey sand with gravel

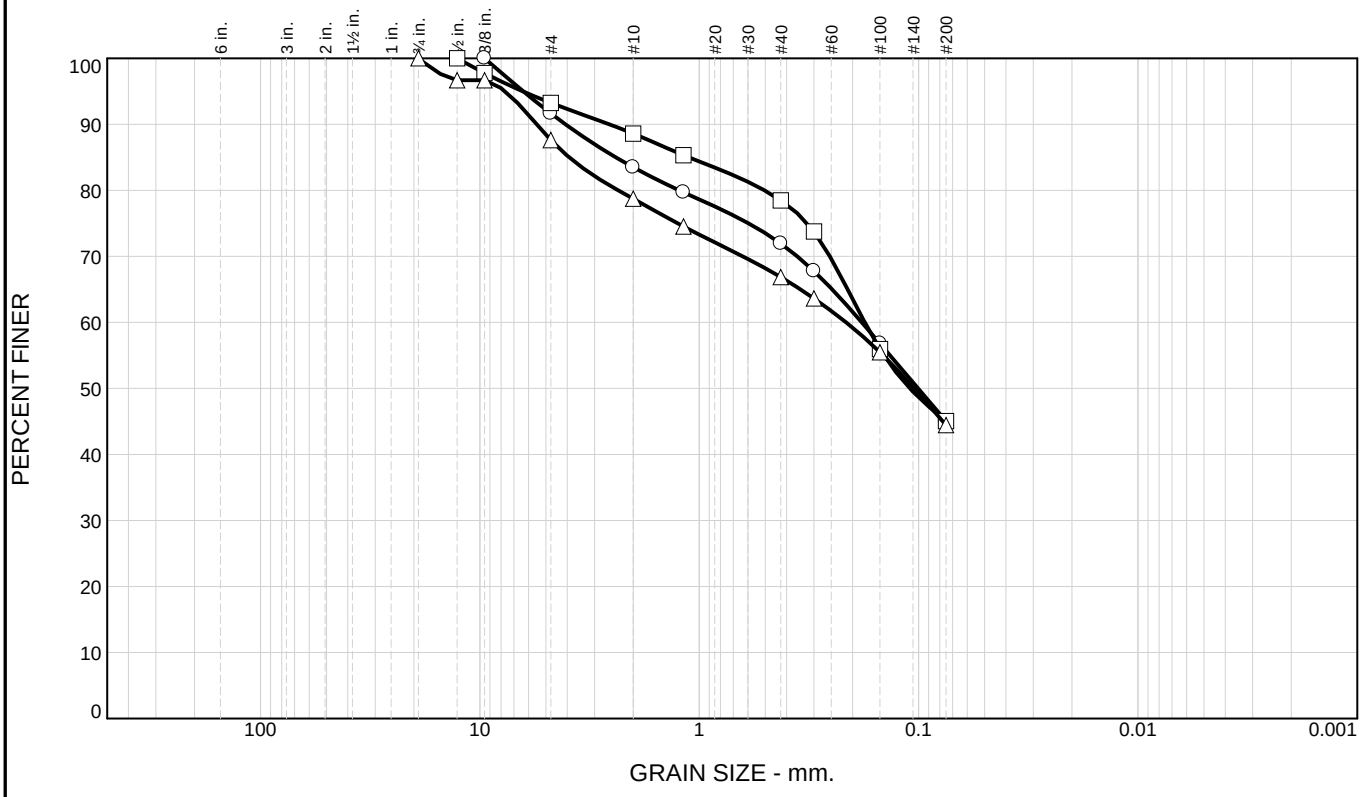
REMARKS:
○
□
△

○ Source of Sample: SWB-2 Depth: 2.0 - 5.0' Sample Number: BULK 1
□ Source of Sample: SWB-2 Depth: 2.5 - 4.0' Sample Number: A
△ Source of Sample: SWB-2 Depth: 5.0 - 6.0' Sample Number: B1

NEVADA DEPARTMENT OF TRANSPORTATION

Client: A. Ablahani
Project: I-515 Soundwalls, Nellis to Mtn. Vista
Project No.: FL-1-08
Figure

Particle Size Distribution Report



	+3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS	AASHTO	PL	LL
○	0.0	8.3	46.7	45.0		SC	A-4(1)	24	33
□	0.0	6.8	48.1	45.1		SC-SM	A-4(0)	21	28
△	0.0	12.4	43.2	44.4					

SIEVE inches size	PERCENT FINER ○	□	△
3/4			100.0
1/2		100.0	96.7
3/8	100.0	97.8	96.7
	GRAIN SIZE		
D_{60}	0.1814	0.1759	0.2139
D_{30}			
D_{10}			
	COEFFICIENTS		
C_c			
C_u			

SIEVE number size	PERCENT FINER ○	□	△
#4	91.7	93.2	87.6
#10	83.5	88.6	78.7
#16	79.7	85.3	74.5
#40	71.9	78.5	66.9
#50	67.8	73.8	63.6
#100	56.8	55.9	55.5
#200	45.0	45.1	44.4

Material Description
○ clayey sand
□ silty, clayey sand
△

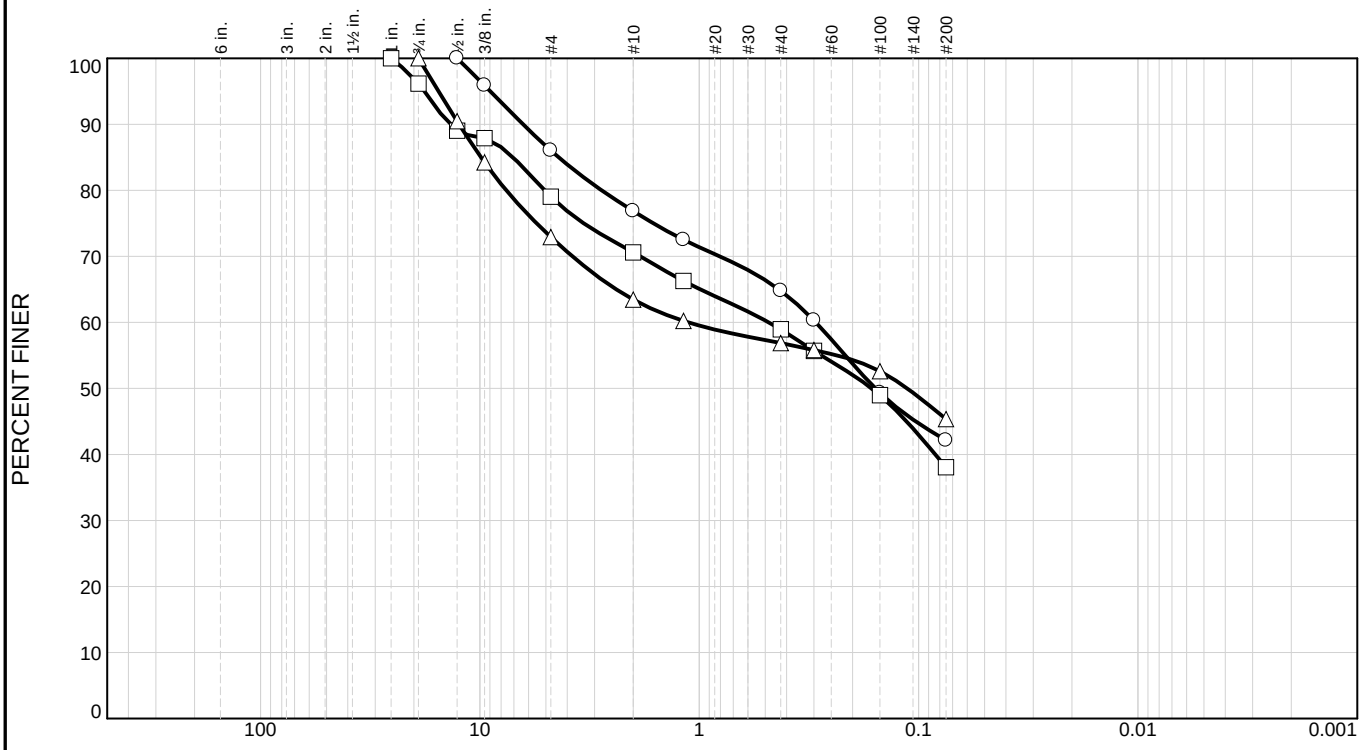
REMARKS:
○
□
△

○ Source of Sample: SWB-2 Depth: 6.0 - 6.5' Sample Number: B2
□ Source of Sample: SWB-2 Depth: 7.7 - 8.2' Sample Number: C1
△ Source of Sample: SWB-2 Depth: 8.2 - 8.7' Sample Number: C2

NEVADA DEPARTMENT OF TRANSPORTATION

Client: A. Ablahani
Project: I-515 Soundwalls, Nellis to Mtn. Vista
Project No.: FL-1-08
Figure

Particle Size Distribution Report



	+3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS	AASHTO	PL	LL
○	0.0	14.0	43.9	42.1		SC-SM	A-4(0)	21	27
□	0.0	21.0	40.9	38.1		SC	A-4(0)	21	30
△	0.0	27.1	27.5	45.4		SC	A-7-6(6)	19	42

SIEVE inches size	PERCENT FINER ○	□	△
1		100.0	
3/4		96.2	100.0
1/2	100.0	89.0	90.5
3/8	95.9	87.9	84.2
GRAIN SIZE			
D_{60}	0.2941	0.4812	1.1220
D_{30}			
D_{10}			
COEFFICIENTS			
C_c			
C_u			

SIEVE number size	PERCENT FINER ○	□	△
#4	86.0	79.0	72.9
#10	76.9	70.6	63.5
#16	72.5	66.3	60.2
#40	64.8	59.0	56.9
#50	60.3	55.7	55.8
#100	49.3	49.0	52.6
#200	42.1	38.1	45.4

Material Description
○ silty, clayey sand

□ clayey sand with gravel

△ clayey sand with gravel

REMARKS:
○

□

△

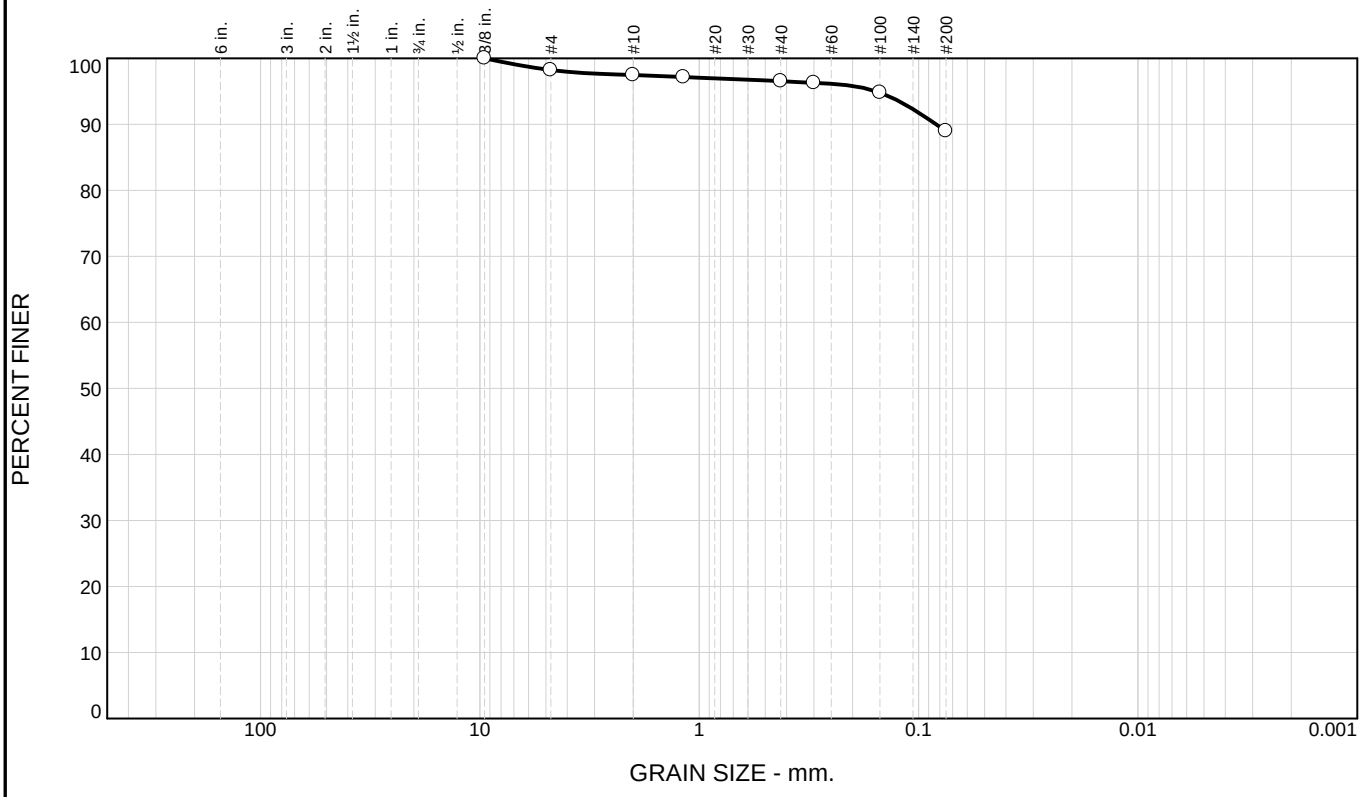
○ Source of Sample: SWB-2 Depth: 9.0 - 10.5' Sample Number: D
□ Source of Sample: SWB-2 Depth: 12.5 - 14.0' Sample Number: E
△ Source of Sample: SWB-2 Depth: 17.5 - 19.0' Sample Number: F

NEVADA DEPARTMENT OF TRANSPORTATION

Client: A. Ablahani
Project: I-515 Soundwalls, Nellis to Mtn. Vista
Project No.: FL-1-08

Figure

Particle Size Distribution Report



	+3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS	AASHTO	PL	LL
○	0.0	1.8	9.2	89.0		CH	A-7-6(42)	23	66

SIEVE inches size	PERCENT FINER ○		
3/8	100.0		
	GRAIN SIZE		
D_{60}			
D_{30}			
D_{10}			
	COEFFICIENTS		
C_c			
C_u			

SIEVE number size	PERCENT FINER ○		
#4	98.2		
#10	97.5		
#16	97.2		
#40	96.5		
#50	96.3		
#100	94.8		
#200	89.0		

Material Description
○ fat clay

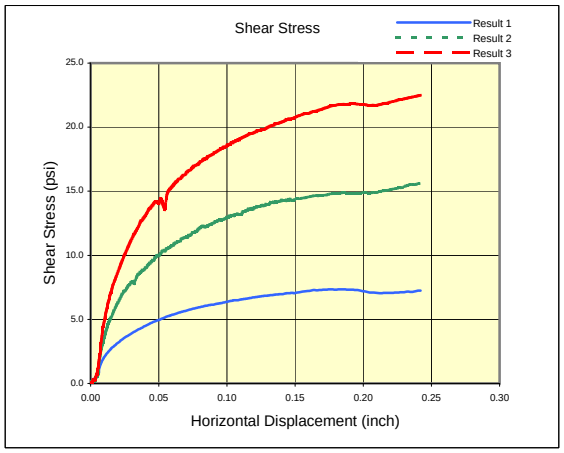
REMARKS:
○

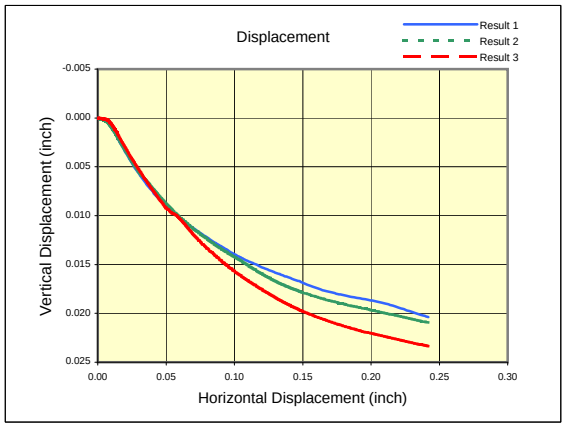
○ Source of Sample: SWB-2 Depth: 25.0 - 26.5' Sample Number: G

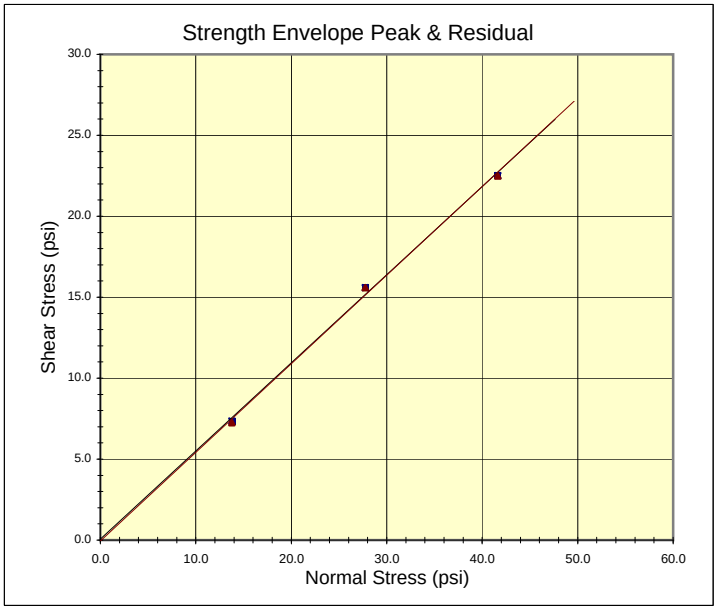
NEVADA DEPARTMENT OF TRANSPORTATION

Client: A. Ablahani
Project: I-515 Soundwalls, Nellis to Mtn. Vista
Project No.: FL-1-08 Figure

DIRECT SHEAR TEST REPORT







Strength Parameters

	Peak		Residual
Friction Angle =	29	degrees	29
Cohesion =	0.07	psi	-0.06

Project: FL-1-08 Boring: SWA-3 Sample: E2

	Result 1	Result 2	Result 3
Specimen:	a	b	c
Date Tested	03/13/2008	03/13/2008	03/13/2008
Diameter (inch):	2.42	2.42	2.42
Height (inch):	1.00	1.00	1.00
Depth (ft):	10.00	10.00	10.00
Moisture (%)	16.6	19.5	21.7
Dry Unit Wt (pcf)	79.5	80.9	79.7
SHEAR			
Displacement Rate($^{in}/_{min}$)	0.0054	0.0054	0.0054
Normal Stress (psi)	13.77	27.75	41.63
Peak Shear Stress(psi)	7.34	15.60	22.50
Residual Shear Stress(psi)	7.2	15.6	22.5
Residual Point Picked @(in)	0.242	0.242	0.242
Time @ Peak Failure (min)	33.4	44.0	44.0

Specimen Comments

a Tan lean clay with sand. Shear at 2000 psf

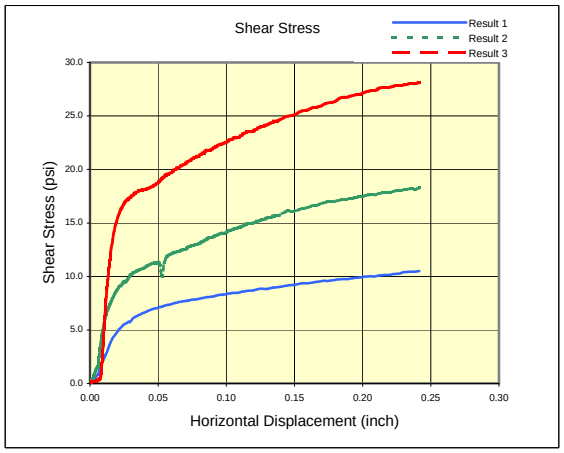
b Tan lean clay with sand. Shear at 4000 psf

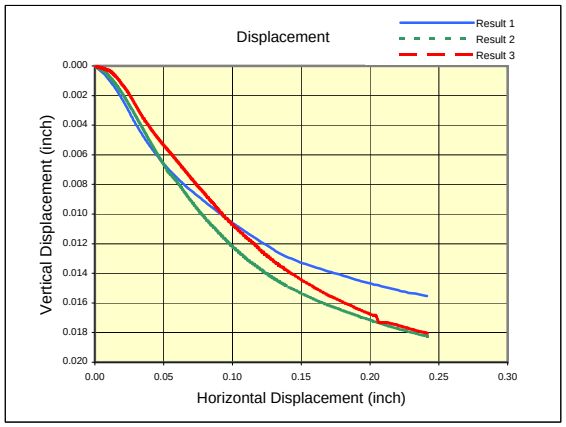
c Tan lean clay with sand. Shear at 6000 psf

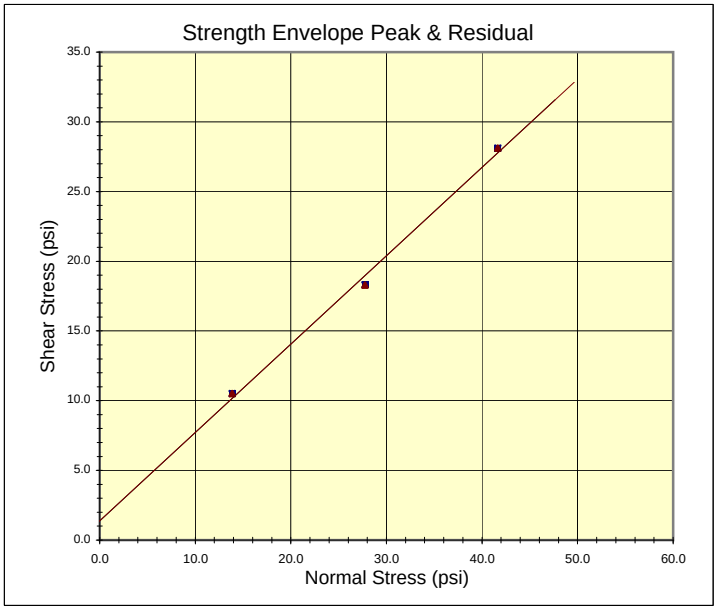
Geotechnical Section

NEVADA DOT

DIRECT SHEAR TEST REPORT







Strength Parameters

	Peak		Residual
Friction Angle =	32	degrees	32
Cohesion =	1.39	psi	1.39

Project: FL-1-08 Boring: SWB-1 Sample: D2

	Result 1	Result 2	Result 3
Specimen:	a	b	c
Date Tested	03/19/2008	03/19/2008	03/19/2008
Diameter (inch):	2.42	2.42	2.42
Height (inch):	1.00	1.00	1.00
Depth (ft):	10.00	10.00	10.00
Moisture (%)	25.7	23.8	24.5
Dry Unit Wt (pcf)	84.1	85.1	84.9
SHEAR			
Displacement Rate($^{in}/_{min}$)	0.0039	0.0040	0.0040
Normal Stress (psi)	13.87	27.76	41.66
Peak Shear Stress(psi)	10.51	18.31	28.11
Residual Shear Stress(psi)	10.5	18.3	28.1
Residual Point Picked @(in)	0.241	0.242	0.242
Time @ Peak Failure (min)	60.4	60.5	60.4

Specimen Comments

a Light brown sandy clay. Shear at 2000 psf. (Recompacted -No. 4 material)

b Light brown sandy clay. Shear at 4000 psf. (Recompacted -No. 4 material)

c Light brown sandy clay. Shear at 6000 psf. (Recompacted -No. 4 material)

Geotechnical Section

NEVADA DOT